MEMO

TO:	[redacted] TransGrid
FROM:	[redacted] WSP
SUBJECT:	Revised estimate of EnergyConnect Biodiversity Offset Liability and Update to Strategy – 9 September 2020
OUR REF:	PS113770-ECO-MEM-010 RevC
DATE:	9 September 2020

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1. INTRODUCTION

1.1 OVERVIEW

This memo provides additional details on the estimated EnergyConnect biodiversity offset liability and recommendations on the Biodiversity Offset Strategy (BOS) options.

This memo furthers the advice provided in the previous offset liability memo (PS113770-ECO-MEM-008 dated 21 May 2020 and PS113770-ECO-MEM-010 Rev A dated 13 August 2020) and previous offset liability advice provided on 24 April 2020 (Appendix A) by incorporating the following:

- changes in the identified alignment to accommodate the Dinawan route at a total distance of 692 km
- a revised construction footprint and clearing assumptions as provided by TransGrid on 4 August 2020 (refer section 1.2).
- updated credit pricing in line with the quarterly credit price review on the 31 July 2020
- refined ecological values from further detailed field surveys completed for the EnergyConnect NSW – Western Section
- results of desktop analysis of potential offset areas.

The memo specifically focuses on the offset liability of EnergyConnect in NSW. A relatively small liability for the EnergyConnect in Victoria is unlikely to significantly change the estimate provided. The offset liability for Victoria will need to be met through one-off payment, prior to construction commencing.

The memo provides recommendations specifically as they relate to establishing Biodiversity Stewardship Agreements (BSAs) for the previously identified [redacted] property and the [redacted] property, which are both located at Renmark Road, Rufus NSW 2648 (as a biodiversity offset for the proposed offset requirements for EnergyConnect (western and eastern sections) under the NSW *Biodiversity Conservation Act 2016* (BC Act) and Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

Level 3, 51-55 Bolton St
Newcastle NSW 2300
PO Box 1162
Newcastle NSW 2300

Tel: +61 2 4929 8300
Fax: +61 2 4929 8382
www.wsp.com

A summary of potential additional BSA options that build on and specifically target the Plant Community Types (PCT)s that make up the majority of the residual offset liability (target PCTs) is also provided.

The potential additional BSA options have been are further evaluated against the total offset liability. The desktop review of these potential additional BSA options has also highlighted the need for much larger areas of land than presented in previous offset liability memo (PS113770-ECO-MEM-008 dated 21 May 2020) to generate the revised quantum of credit requirements. The desktop assessment did not identify any suitable additional BSA options for residual PCTs associated with Threatened ecological communities in the east of alignment. As a result, these PCTs are more likely to be resolved through payment into the BCF and/or purchase from existing available credits. The likely costs of satisfying the entire offset requirement for EnergyConnect by paying into the Biodiversity Conservation Fund (BCF) is provided. This cost is then compared to the likely costs of satisfying the offset requirement through purchase and management of the candidate lands as BSAs. The memo also provides an indication of the likely costs involved in managing the candidate lands and provides recommendations with regard to any future steps required for the purchases and establishment of the candidate lands as a single or multiple BSAs.

An estimated cost of implementing a BOS incorporating the likely outcome of combined BCF and multiple BSA approach for the entire EnergyConnect project (including the candidate lands) is also provided, to enable cost comparison for the project offset requirements against payment into the BCF.

1.2 CLEARING SCENARIO

The offset liability is based on a revised construction footprint and clearing assumptions as provided by TransGrid on 4 August 2020. The clearing scenario is explained below with an explanatory schematic provided as Figure 1.1. The clearing scenario:

- assumes an 80 m wide easement requirement
- requires vegetation impacts only to a 60 m wide section of the 80 wide easement for construction and maintenance activities. Within this 60 m section vegetation would be maintained between 2 to 4 m in height with the increased height being permitted as distance from the transmission line increases
- spaces towers at 480 m centres along the full route and includes a full vegetation clearing footprint of 60 m by 80 m at each tower
- includes a 10 m wide access track running the full length of the alignment route within the easement area. This 10 m wide access track would require full clearing of all vegetation
- assumes full clearing for the two site compound facilities at Anabranch South and Buronga and also for the Buronga substation expansion footprint area.

This scenario has been used to calculate the vegetation clearing required for EnergyConnect.

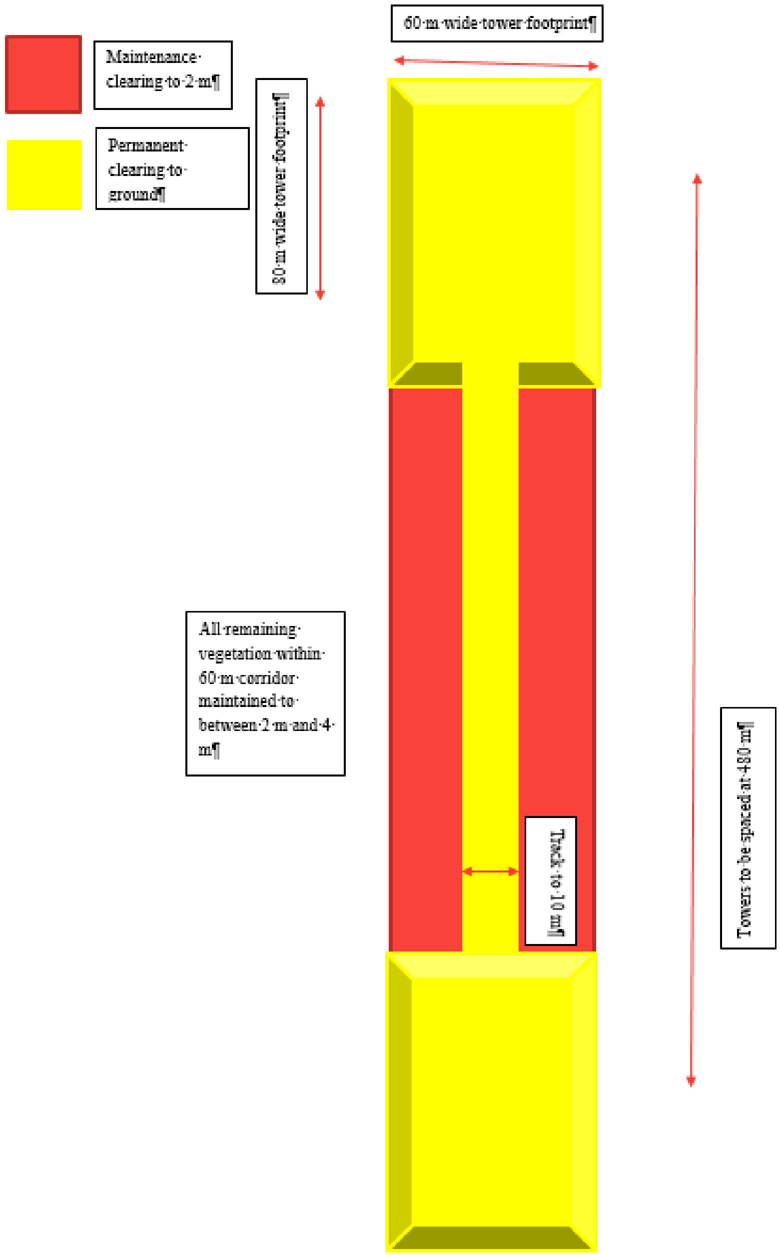


Figure 1.1 Vegetation clearing scenario

2. BIODIVERSITY CREDIT SUPPLY REGISTER

The NSW Department of Planning, Industry and Environment (DPIE) maintains a public register which lists biodiversity credits generated at Biodiversity Stewardship sites for sale and a Biodiversity Stewardship site expressions of interest (EOI) register. A review of the Biodiversity and Offsets Management System (BOAM) Credit Supply Register was undertaken on the 13 March 2020. A summary of the review of the public registers is as follows:

- there are no credits currently available to purchase in the Murray Darling Depression bioregion so purchase of existing credits is not an option to satisfy the credit requirement for the Mallee vegetation in the west of the alignment (EnergyConnect NSW – Western Section)
- there were no EOIs on the register for suitable credits in the Murray Darling Depression bioregion

- there are no credits Pending Review for in the Murray Darling Depression bioregion.

Purchase of existing biodiversity credits from existing Biodiversity Stewardship sites is therefore not currently an option for the EnergyConnect project for the EnergyConnect NSW – Western Section.

It should be noted that some credits are available on the market for purchase in the EnergyConnect NSW – Eastern Section and these required future consideration. The market price of these credits is likely to be less than the option to pay into the BCF, however the quantum of credits availability and credit price is currently not expected to make a material difference to the EnergyConnect offset liability.

3. BIODIVERSITY STEWARDSHIP AGREEMENTS

3.1 RATIONALE FOR CONSIDERING BSA APPROACH

Given the lack of available biodiversity credits for the required PCTs and threatened species that are required to offset the likely impacts of the project on the Mallee vegetation in the west of the alignment (EnergyConnect NSW – Western Section), development of one or more Biodiversity Stewardship sites is the preferred option available. Most of the offset liability for impact to non-threatened Mallee vegetation in the EnergyConnect NSW – Western Section could potentially be met with the establishment of one or more Biodiversity Stewardship sites. Similarly, it is expected that for EnergyConnect NSW – Eastern Section, development of future BSA's will be the most cost-effective approach.

Once BSAs are arranged for the entire EnergyConnect in NSW residual credit requirements (particularly species credits) would be likely to be obtained via purchase from the BCF.

3.2 PRINCIPALS USED TO IDENTIFY BSA OPPORTUNITIES FOR ENERGY CONNECT NSW

Biodiversity and landscape characteristics are important consideration in the identification and securing of appropriate Biodiversity Stewardship Sites. The following characteristics have been used in guiding the preferred offset strategy for the project:

- presence of relevant threatened biodiversity and conservation values
- distance from the project
- current condition and potential for improvement
- connectivity.

These characteristics are described in detail below.

Presence of relevant biodiversity and conservation values

Offsets must be targeted and offset the impacts on a 'like for like' or 'better' basis. From the clearing of Mallee vegetation in the west of the alignment (Border to Balranald) to the likely unavoidable clearing of White Box – Yellow Box Woodland near Wagga Wagga, it will be necessary to develop an overall BOS that addresses the complexities and variabilities of biodiversity values across a large portion of the width of NSW.

Distance from the project

Biodiversity offsets should be located appropriately and offset the impact in the same region. Ideally, offset habitat areas should be located within the region of the project. For example, the project offsets for the Mallee vegetation in the west of the alignment (Border to Balranald) should be located in the South Olary Plain sub-region of the Murray Darling Depression Interim Biogeographic Regionalisation for Australia (IBRA) Bioregion where possible.

Therefore, the initial preference was to investigate opportunities within or adjoining to the current alignment corridor.

Choosing offsets within the region of the project is also consistent with the need to provide compensatory habitat or similar type and quality to that being removed. The integrity of the habitat network and biodiversity values of the locality should be retained, habitat secured, and existing corridors consolidated for local flora and fauna populations.

In addition to the ecological benefits, by choosing offsets located within the region of the project, conservation planning can be integrated with development planning and this is also likely to benefit the reputation of the proponent, particularly with local stakeholders.

Current condition and potential for improvement

Habitat condition gives an indication of the quality for flora and fauna habitat and long-term variability. The condition of a remnant is a result of several factors including weed invasion, fragmentation, pollution and disturbances including clearing, fire and grazing. The condition provides an index of a site's potential to support threatened species, populations and communities. Although it is preferable that the condition/habitat quality of offset areas exceeds or matches that of the habitat being removed, this is not always achievable. Where the condition or quality of the offset is not equivalent to that of the area being cleared, a greater area of offset may be required.

Where the condition of habitats can be improved through changes in the management (for example the cessation of grazing and weed control), this improvement in condition can be used to offset a development.

Connectivity

Connectivity of habitats is essential for the long-term survival of many species because it facilitates the movement on a local scale, for foraging and sheltering, as well as on a regional or even national scale as a wildlife corridor for dispersal and migration. Remnants with habitat linkages are more likely to maintain their biodiversity in the long-term because wildlife corridors:

- provide increased foraging area for wide-ranging species
- provide cover for movement between habitat patches, particularly for cover-dependent species and species with poor dispersal ability and enhance the movement of animals through sub-optimal habitats
- reduce genetic isolation
- facilitate access to mix of habitats and successional stages to those species which require them for different activities (for example foraging or breeding)
- provide refuge from disturbances such as fire
- provide habitat in itself
- link wildlife populations and maintain immigration and re-colonisation between otherwise isolated patches. This is turn may help reduce the risk of population extinction (Wilson & Lindenmayer 1995).

Offsets are likely to be of greater biodiversity value where they are located adjacent to remnant vegetation creating a larger remnant or where they provide linkages within an otherwise fragmented landscape. Connectivity of habitats creates larger remnants that are likely to be of higher quality and support higher biodiversity. Compensatory habitat should act to consolidate existing corridors or, occur adjacent to existing area of native vegetation in order to maintain or increase their habitat quality and long-term viability.

Regulatory requirements

In addition to the above characteristics, consideration of the regulatory requirements is also required

Section 6.3 of the BC Regulations outlines that the like for like biodiversity credits are considered appropriate if they represent:

- the same Threatened Ecological Community (if applicable) or for non-threatened vegetation be in the same vegetation class and in the same or higher offset trading group
- are located in the same or an adjoining IBRA subregion as the project site or
- are located in a subregion that is within 100 km of the project site
- must contain hollow-bearing trees if the project impacts on vegetation with hollow-bearing trees.

Section 6.4 of the BC Regulations outlined the variation rules for Threatened Ecological Communities and indicate that appropriate offsets include those that:

- represent the same vegetation formation, and they are in the same or a higher offset trading group
- are located in the same or an adjoining IBRA subregion as the project site or;
- are located in a subregion that is within 100 km of the project site
- must contain hollow-bearing trees if the project impacts on vegetation with hollow-bearing trees.

4. OFFSET LIABILITY UNDER DIFFERENT BOS SCENARIOS

It is noted that the final biodiversity offset liability will be influenced by the following factors which are not able to be confirmed at this stage:

- final construction footprint and clearing requirements for the exact final project alignment
- field validated data set which will confirm the on the ground conditions, particularly for the east
- adjustments to the credit prices which occur quarterly and will be subject to fluctuation until the project is approved.

As a result of these factors the liabilities identified in this memo are an estimate based on the information available to WSP at August 2020.

4.1 BIODIVERSITY CONSERVATION FUND (BCF) PAYMENT OPTION

The EnergyConnect offset liability through the option of only making payment into the BCF would be approximately $235,609,278. This estimate combines ecosystem and species credit estimates.

The key benefit for this option would be the ability to meet the entire EnergyConnect liability prior to construction in accordance with the BAM. There is also no ongoing liability and or management responsibility for land ownership or implementation of a BSA.

The key negative for this option is the premium cost liability for the convenience of a the ‘pay and walk away’ option.

There is also no direct benefit to the community and surrounding conservation outcomes that can be directly leveraged by TransGrid.

4.2 MIXED OFFSET OPTION COMBINING BCF PAYMENT WITH BSA

4.2.1 [redacted] BSA ONLY

TransGrid have previously agreed to progress with the establishment of the [redacted] Offsets under a BSA as part of the BOS for EnergyConnect.

The cost of establishing BSAs for these two properties will incorporate two key parts:

- the costs associated with land purchase costs/opportunity loss
- an in-perpetuity management cost.

For [redacted] the land purchase cost is *estimated* at [redacted] and is subject to TransGrid confirmation.

The in-perpetuity management cost, to be paid in full upfront to the BCF and returned to the landholder on annual basis to undertake conservation management works. This cost is determined by the Biodiversity Conservation Trust (BCT) prior to establishing the BSA and is known as the Total Fund Deposit (TFD). The TFD for the [redacted] is *estimated* at an additional approximately $28,274,000 for the 20- year management period (Appendix C).

The total combined offset liability of a mixed approach incorporating the Tareena and [redacted] BSAs with a residual payment into the BCF would therefore equate to approximately $190,011,549, (including the residual BCF liability of $158,737,549).

The full details of offset liability potentially met by the BSA and the outstanding offset liability is provided in Appendix B. Details of management and likely costs are provided in Appendix C.

4.2.2 ADDITIONAL BSA OPPORTUNITIES FOR ENERGY CONNECT NSW-EAST

A GIS desktop assessment using the offset principles in Section 2.1, has identified potential additional candidate properties with ability to contribute to the EnergyConnect offset liability credit requirements in accordance with Section 6.3 and 6.4 of the BC Regulations.

The desktop analysis of these potential candidate properties was initially targeted at land holding that intersect by the current alignment corridor and/or those adjoining crown land/National Park estate. The results of these investigations are presented in Figure 4.1.

The potential additional candidate BSAs specifically targeted the most significant residual ecosystem and species credit liabilities associated with six like-for-like ecosystem types generating the majority ($110,871,027) of the $158,737,549 BCF liability as identified in Table 4.1.

Table 4.1 Summary of target PCTs corresponding with most significant residual ecosystem credit liabilities

PCT	TOTAL LIABILITY	CURRENT CREDIT PRICE[2]	OFFSET LIABILITY
PCTs 13 and 15 - Black Box	[redacted]	$2,737.32	[redacted]
Curly Windmill Grass	[redacted]	$19,864.47	[redacted]
Cotton Bush open shrubland	[redacted]	$10,717.17	[redacted]
Weeping Myall open woodland	[redacted]	$5,998.05	[redacted]
Forb-rich Speargrass	[redacted]	$14,347.58	[redacted]
PCTs 3-11 River red Gum	[redacted]	$7,377.62	[redacted]
TOTAL	-$10,208		$110,871,027

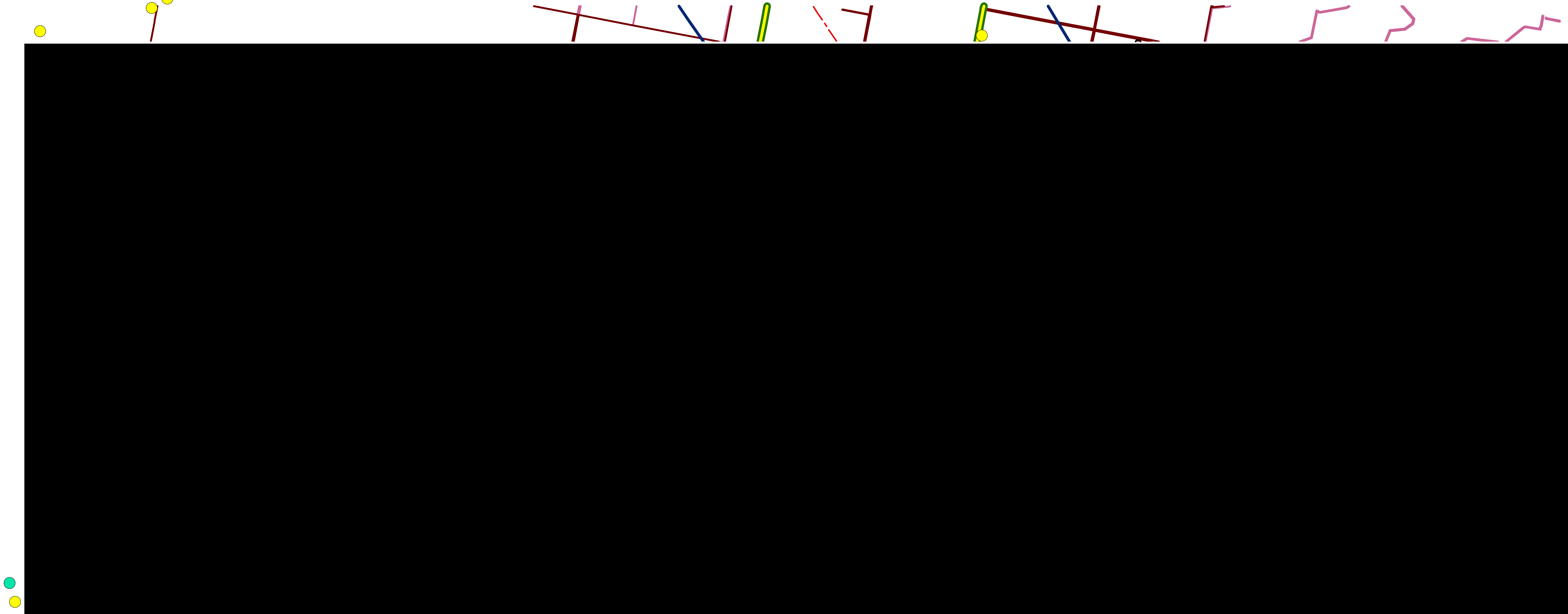
1) based on desktop state-wide vegetation mapping and assumed benchmark condition
2) Payment into BCF is based on BOPC credit price as of 31/7/2020

[redacted]

[redacted]

[redacted]

[redacted]



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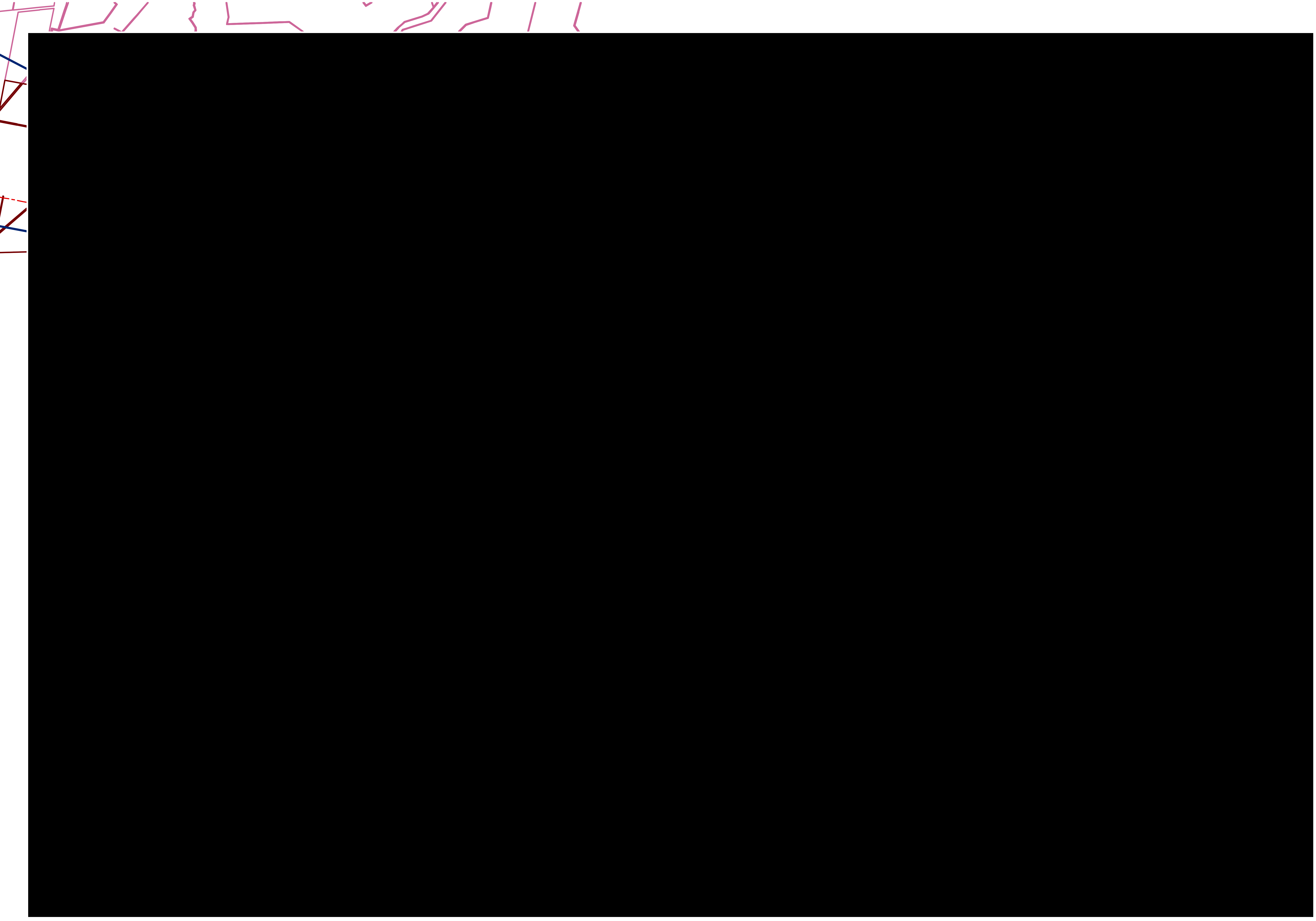


[redacted]

The desktop investigations show the majority of PCTs identified with significant outstanding credit liabilities can be sourced from the areas shown in Figure 4.1 and that additional BSA's are available as a primary option for the project. Extensive areas of suitable PCT's are available for future analysis and pursuit.

A total of 12 candidate BSAs have initially been shortlisted for further BSA investigation. Within each land holdings a preliminary BSA option or portion of the land holding considered to be more suitable for a BSA has been identified. This BSA option is *indicative*, purely for initial land owner discussions and subject to further field investigations should the land owner express an interest

The candidate BSA options would generate significant areas and credits of the targeted ecosystem liabilities. A summary of each is presented in Table 4.2.

Table 4.2 Summary of potential ecosystem credit generation at candidate BSAs for targeted ecosystem

	OFFSET PROPERTY OPTION[1, 2]											
CANDIDATE BSA	1	2	3	4	5	6	7	8	9	10	11	12
Total Area (ha)[3]	358.78	293.70	12,077.58	13,376.73	19,015.98	2,988.76	204.14	4,890.45	84.68	6,470.83	2.37	7,187.49
PCTs 13 and 15 - Black Box (Credits)	1,237.07	1,067.02	961.55	204.12	1,486.86	427.13	166.34	1,021.13				1,069.91
PCT 160 Cotton Bush shrubland (Credits)			24,140.43	34,636.90	1,056.053					47.02		7,672.28
PCT 46 Curly Windmill Grass (Credits)	182.86	107.77	2,812.82	2,571.09	17,382.65	1,363.80						2,330.87
PCT 44 Forb-rich Speargrass (Credits)					21,679.39	1,500.44	247.77	9,719.34	130.06	6,967.94		
PCTs 3-11 River red Gum (Credits)					4,828.60			7.74		833.67		
Weeping Myall woodland (Credits)					18,261.92	6,091.82	402.45	5,578.20	184.91			

1) Based on desktop State-wide vegetation mapping
2) BSA credits generated based on field verified vegetation mapping and a 4 credits per hectare for non-assisted regeneration.
3) Offset size based on initial option as presented in Figures 4.1 and includes only 50% of mapped area for Candidate

4.2.3 RECOMMENDATIONS ON ADDITIONAL BSA OPPORTUNITIES

The candidate BSAs in Table 4.2 indicatively provide multiple options for establishing additional BSAs to meet the majority of the targeted ecosystem requirement.

A summary of the preferred options, incorporating combinations of the candidate BSAs options to maximise the benefit, their estimated cost for establishment and any residual liability is provided below in Table 4.3.

Table 4.3 Summary of preferred options for establishing additional candidate BSAs for targeted ecosystem

CANDIDATE BSAS	TOTAL AREA BSA (HA)[3]	TOTAL RESIDUAL CREDIT LIABILITY FOR TARGETED ECOSYSTEMS[1, 2,]	TOTAL BSA COST[4,]	TOTAL COST FOR BSAS FOR TARGETED ECOSYSTEMS	SAVING FROM ALTERNATIVE $110,871,027 PAYMENT TO MEET BCF LIABILITY[5]
5	9,507.99	$19,474,825	$47,539,962	$67,014,787	$43,856,246
4 and 8	15821.96	$4,210,601	$79,109,821.77	$83,320,423	$27,550,610
12 and 8	9632.72	$1,417,446	$48,163,633	$49,581,079	$61,289,954
3 and 8	14522.8	$1,388,879	$72,614,080	$74,002,959	$36,868,074

1) Based on desktop State-wide vegetation mapping
2) BSA credits generated based on field verified vegetation mapping and a 4 credits per hectare for non-assisted regeneration.
3) Offset size based on initial options as presented in Figures 4.1 and includes only 50% of mapped area for Candidate sites 5 and 8.
4) Land value for additional BSAs at $2500 a hectare and in-perpetuity management for additional BSAs assumes non-assisted regeneration and $2500 a ha
5) Payment into BCF is based on credit price as of 31/7/2020

Each of these preferred options for additional candidate BSAs would meet between 82% and 99% of the targeted ecosystem liabilities and would provide indicative saving of approximately $27,550,610-$61,289,954 to the alternative option of payment into the BCF.

Additional saving on species credit liabilities and non-targeted PCTs within these BSAs are also likely but have been excluded from the analysis without further field verification.

4.3 SUMMARY OF KEY DRIVERS FOR OFFSETS LIABILITY AND OPPORTUNITIES TO REDUCE.

Table 4.4 tabulates the key drivers for offsets liability and outlines a confidence level used in the current offset liability estimate for each driver. It also includes reference to key opportunities to reduce offset liability.

In summary, the key drivers likely to influence the final offset liability will be in the following two stages:

1. Design and construction avoidance and/or minimise within areas of high conservation and high condition biodiversity hot spots
2. Early identification and establishment of BSA offset sites to reduce the quantum of the offset liability required.

Table 4.4 Summary of Key Drivers for Offsets Liability

KEY DRIVER FOR OFFSET LIABILITY	CONFIDENCE LEVEL USED IN THIS OFFSET LIABILITY MEMO	OPPORTUNITIES TO REDUCE LIABILITY
Areas of direct clearing - construction/clearing envelope	High 75%	— Siting of direct clearing areas within exotic vegetation and / or existing cleared areas for the following; — — Tower pads — — Minimise new access/maintenance tracks. — Maximise use of existing access points — Minimising track and tower pad design for minimal impact (currently 10 m wide new tracks assumed)
Maintenance of vegetation	High 75%	— Investigate further design information and justification of reduced level of impact within the proposed easement areas (rather than 100% impacts to 60 m wide corridor). — Investigation of increased tower heights to avoid maintenance requirements for biodiversity within corridor — Prioritise avoidance of areas containing tall vegetation typically within the maintenance height requirements
Conservation status of PCTs	High 75%	— Prioritising avoidance within areas of any TEC — Prioritising avoidance of Matter of National Environmental Significance (MNES) TEC
Vegetation Condition/ Habitat quality	Moderate 50%	— Prioritising avoid/minimise within areas of high quality condition PCTs, e.g. old growth Mallee or intact conservation reserves.
Threatened Species habitat	Low 20%	— Avoid large hollow bearing tree impacts from construction or maintenance areas — Minimise areas of high understorey vegetation — Minimise impacts to areas that become known during the surveys to be important for threatened species — Minimise impact to MNES threatened species

KEY DRIVER FOR OFFSET LIABILITY	CONFIDENCE LEVEL USED IN THIS OFFSET LIABILITY MEMO	OPPORTUNITIES TO REDUCE LIABILITY
Land Value of potential offset BSA sites	[redacted]	[redacted] [redacted] [redacted] [redacted] [redacted] [redacted] additional biodiversity offset suitability values
In perpetuity management of BSA offset sites	Moderate 50%	— Identification of moderate condition biodiversity offset sites with greatest potential for low cost natural unassisted rehabilitation as opposed to higher disturbed areas with significant management cost

5. KEY RISKS TO BIODIVERSITY OFFSET LIABILITY ESTIMATE

The key risks to potential increases in the biodiversity offset liability estimate relate to the following:

1. The risk that DPIE requires the offset to be calculated using a higher liability scenario (full clearing for the entire route) than set out in this memo, and

   In terms of the likelihood of DPIE accepting the calculated liability scenario in this memo, the probability of this should be considered. Since 2008 under BioBanking and now under the latest BAM, there has always been provision for adjusting the likely end vegetation condition of impacted areas to be more than zero. For example both BioBanking and BAM provide for Management Zones to be differentiated, depending on what impacts are likely to occur within each zone. A Management Zone could be classified as an Asset Protection Zone for bushfire protection, where some clearing of vegetation is required, but some trees, shrubs and groundcovers can be retained. Classifying a Management Zone in this way allows the assessor to reduce the credit requirement for that zone, as not all vegetation is required to be cleared. In contrast, a Management Zone where all vegetation is completely cleared would generate a full number of credits per hectare for that area.

   Similarly, BioBanking and now BAM do provide the flexibility for other reduced impact outcomes, such as transmission easements. The Biodiversity Assessment Method Operational Manual Stage 2 (DPIE 2019) specifically includes the following guidance in Table 1. An excerpt of the part of Table 1 relevant to this consideration (Asset Protection Zones and Easement for services) has been provided below:

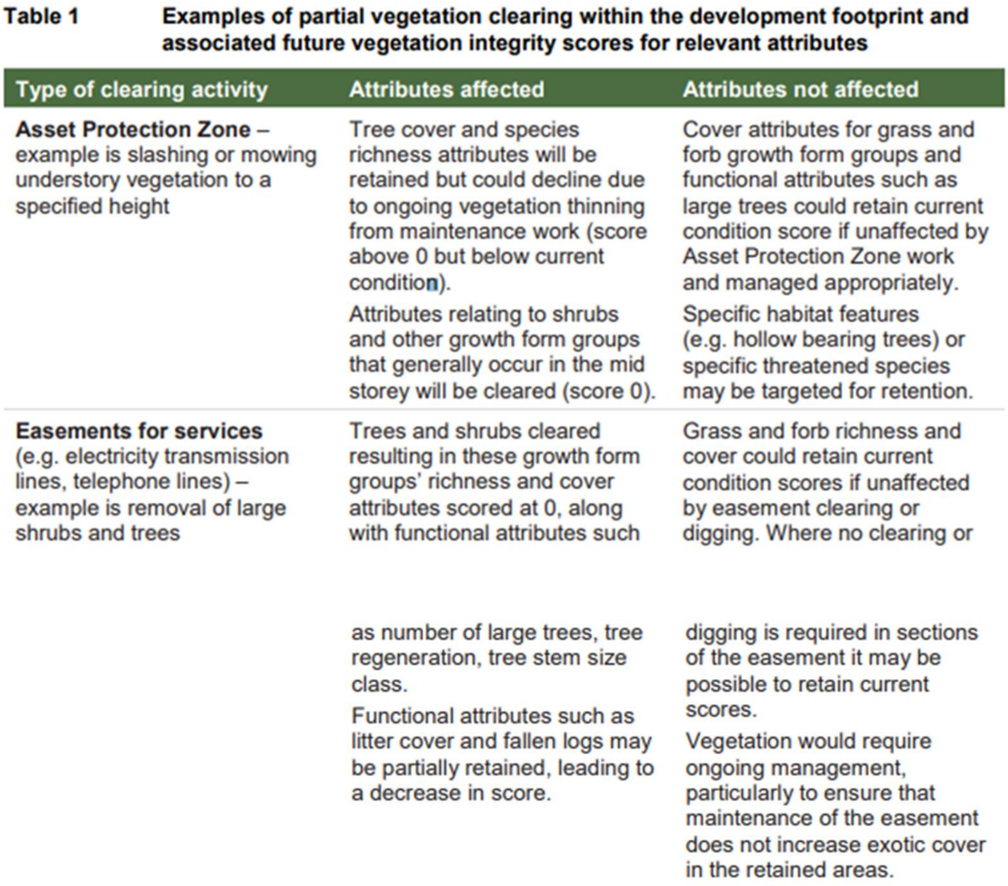


Table 1 **Examples of partial vegetation clearing within the development footprint and associated future vegetation integrity scores for relevant attributes**

Type of clearing activity	Attributes affected	Attributes not affected
Asset Protection Zone – example is slashing or mowing understory vegetation to a specified height	Tree cover and species richness attributes will be retained but could decline due to ongoing vegetation thinning from maintenance work (score above 0 but below current condition). Attributes relating to shrubs and other growth form groups that generally occur in the mid storey will be cleared (score 0).	Cover attributes for grass and forb growth form groups and functional attributes such as large trees could retain current condition score if unaffected by Asset Protection Zone work and managed appropriately. Specific habitat features (e.g. hollow bearing trees) or specific threatened species may be targeted for retention.
Easements for services (e.g. electricity transmission lines, telephone lines) – example is removal of large shrubs and trees	Trees and shrubs cleared resulting in these growth form groups' richness and cover attributes scored at 0, along with functional attributes such as number of large trees, tree regeneration, tree stem size class. Functional attributes such as litter cover and fallen logs may be partially retained, leading to a decrease in score.	Grass and forb richness and cover could retain current condition scores if unaffected by easement clearing or digging. Where no clearing or digging is required in sections of the easement it may be possible to retain current scores. Vegetation would require ongoing management, particularly to ensure that maintenance of the easement does not increase exotic cover in the retained areas.

It can be seen from the BAM table above, that the system is specifically designed to allow for calculation of partial vegetation retention within impact zones.

A search of the NSW Major Projects website reveals that there are no known examples of implementation of this approach for new transmission lines for Major Projects in NSW. However, given the BAM specifically allows for this approach (with adequate justification), the probability of this approach being accepted is considered to be relatively high.

Of local and regional relevance to PEC is the very large solar farm Darlington Point Solar Farm (DPSF), that was approved in December 2018 by DPIE as a Major Project (SSD). The DPSF is one of the largest solar farms currently under construction in Australia. This project was assessed by the same office of OEH which the PEC project will be assessed by. The Biodiversity Assessment Report by EPS (2018) for DPSF contained a justified analysis for each management zone. This included some forested and grassland communities only having a partial loss of vegetation condition for management zones within the solar panel footprint. While the calculations for that project were undertaken under the old BioBanking system, a very similar principle is expected to be able to be applied under the BAM (in accordance with the BAM Table 1 above). Significant credit savings were achieved for the DPSF project using that approach. Original estimates of biodiversity offset credit liability assuming full impact were approximately 25,000 ecosystem credits. The final approval resulted in a minimum ecosystem credit liability of 3,736, with a maximum liability (depending on post-construction monitoring outcomes) of 7,274 ecosystem credits. Note that these credit numbers are in the old BioBanking currency (credit value), which is different to the new BAM currency (credit value).

Overall, the probability therefore of this discounted approach being accepted is considered to be relatively high. This is difficult to quantify, however based on experience we consider that the likely level of success of the discounted approach included in the assumed liability calculation within the memo would be in the order of approximately 60 - 80%.

2. The risk of not being able to secure suitable land under a BSA to offset the environmental liability, and would require payment into a fund instead, which presents a higher cost.

The offset liability estimate has provided for the potential establishment of BSAs to meet most of the project offset liability. The BSAs for [redacted] are in the final stages of land holder negotiation for acquisition and have had field verification of the biodiversity values and management requirements. Therefore, the probability of these two BSAs not being secured is considered to be very low (<10%) and not considered further.

The establishment of additional BSAs for residual ecosystem credit requirements not provided by [redacted] is in the early phase of identifying candidate land holding with the potential biodiversity values required. This memo identifies 12 candidate BSAs that based on desktop analysis of broad scale vegetation mapping have potential to meet the project offset liability for a substantial portion of the targeted PCTs driving the majority of residual credit requirements. The desktop analysis has reduced the risk of the targeted PCTs not being available to establish a BSA. However, as land holder negotiation have yet to commence and there are currently no registered EOI for BSA within the region there are a number of residual significant risks to establishing additional BSAs, including;

- landholder unwilling to enter into sale or third party establishing of in perpetuity conservation agreements
- landholder unwilling to subdivide or enter into a partial sale or third-party establishing of perpetuity conservation agreements making BSA unviable
- land value significantly exceeds 2500 ha estimate making BSA cost prohibitive
- management requirements significantly exceed 2500 Ha estimate making BSA cost prohibitive
- third-party claim or lease encumbrance on title prohibitive to BSA establishment
- desktop mapping is identified as incorrect following field validation making BSA unsuitable for target PCTs.

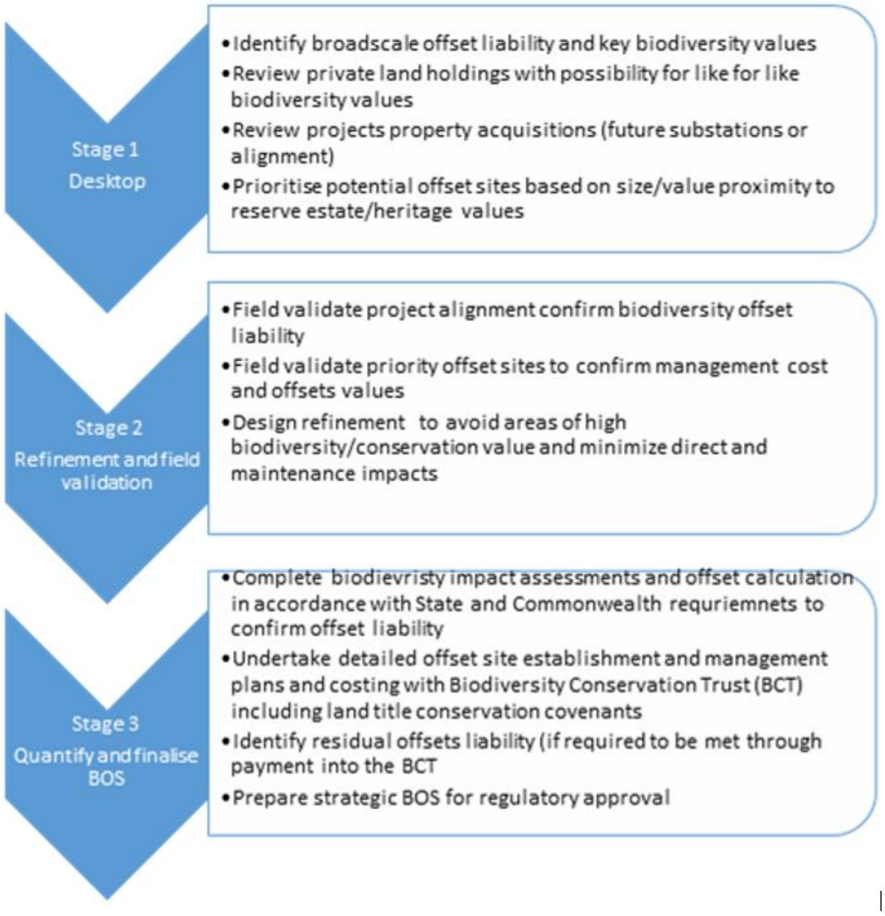
6. RECOMMENDED APPROACH AND STAGING OF THE BIODIVERSITY OFFSET STRATEGY

Biodiversity offset costs can be considerable for a project of this size and as such this needs to be a key consideration throughout the entire project timeline. This is important to reduce the overall credit liability of the project while still meeting the technical obligations for offsetting of the project.

At all times it is recommended to be proactive with both the State and Commonwealth determining authorities to ensure that the offsets outcomes that are to be provided will be acceptable as part of the EIS process.

The main stages in developing the Biodiversity Offset Strategy (BOS) are conceptually shown below in Figure 6.1.

Figure 6.1 Stages in developing the BOS



- Identify broadscale offset liability and key biodiversity values
- Review private land holdings with possibility for like for like biodiversity values
- Review projects property acquisitions (future substations or alignment)
- Prioritise potential offset sites based on size/value proximity to reserve estate/heritage values

- Field validate project alignment confirm biodiversity offset liability
- Field validate priority offset sites to confirm management cost and offsets values
- Design refinement to avoid areas of high biodiversity/conservation value and minimize direct and maintenance impacts

- Complete biodievristy impact assessments and offset calculation in accordance with State and Commonwealth requriemnets to confirm offset liability
- Undertake detailed offset site establishment and management plans and costing with Biodiversity Conservation Trust (BCT) including land title conservation covenants
- Identify residual offsets liability (if required to be met through payment into the BCT
- Prepare strategic BOS for regulatory approval

6.1.1 RELEVANT CLAUSES OF THE BAM AND BC ACT FOR OFFSETS ON STATE SIGNIFICANT INFRASTRUCTURE

Under the BC Act, *Division 4 Biodiversity assessment and offsets 7.14 State significant development or infrastructure* is the relevant guiding legislation regarding biodiversity offsets. The specific clauses under this division are (with important wording applicable to the project highlighted in bold):

1. *This section applies to an application for development consent for State significant development under Part 4 of the Environmental Planning and Assessment Act 1979, or an application for approval for State significant infrastructure under Part 5.1 of the Environmental Planning and Assessment Act 1979, that is required under Division 2 to be accompanied by a biodiversity development assessment report.*
2. *The Minister for Planning, when determining in accordance with the Environmental Planning and Assessment Act 1979 any such application, is to take into consideration under that Act the likely impact of the proposed development on biodiversity values as assessed in the biodiversity development assessment report. The Minister for Planning may (but is not required to) further consider under that Act the likely impact of the proposed development on biodiversity values.*
3. *If the Minister for Planning decides to grant consent or approval and the biodiversity offsets scheme applies to the proposed development, the conditions of the consent or approval may require the applicant to retire biodiversity credits to offset the residual impact on biodiversity values (whether of the number and class specified in the report or other number and class). The residual impact is the impact after the measures that are required to be carried out by the terms or conditions of the consent or approval to avoid or minimise the impact on biodiversity values of the proposed development.*
4. *A condition to retire biodiversity credits is required to be complied with before any development is carried out that would impact on biodiversity values. If the retirement of particular biodiversity credits applies to a stage of the development, compliance with the condition for their retirement is postponed until it is proposed to carry out that stage of the development.*
5. *This section does not operate to limit the matters that the Minister for Planning may take into consideration in relation to the impact of proposed development on biodiversity values, the measures that the Minister may require to avoid or minimise those impacts or the power of the Minister to refuse to grant consent or approval because of those impacts.*

Importantly, these clauses indicate that there is Ministerial discretion in determining the final quantum of the offset credit requirements and outcome.

Significantly for EnergyConnect and the preferred BOS of combined BSAs and residual payment into the BCF. The establishing of the BSA is likely to take at least 12 months following land owner agreement. This timeframe is therefore likely to require Ministerial discretion in relation to Clause 4:

— *A condition to retire biodiversity credits is required to be complied with before any development is carried out that would impact on biodiversity values.*

7. SUMMARY

In summary, the EnergyConnect offset liability would be best met by a combination of the following two approaches to offsets:

1. Incorporating project-sourced offset areas from BSA establishment to satisfy the offset requirement for ecosystem credit liability, for all sections of EnergyConnect in NSW.
2. Payment into the BCF for the residual liabilities, particularly for species credits.

This approach will allow for the offset package to deliver an enduring in-perpetuity conservation outcome within the local area that will directly benefit the impacted biodiversity values of the project, while also being the most cost-effective approach. The most realistic offset liability for the project incorporates a proportional cost from the two approaches outlined above and is summarised in Table 6.1 below.

The offset liability provided below incorporates the provision of the BSA approach to establishing and meeting the ecosystem credit offset liability for the non-threatened Mallee vegetation liabilities.

A desktop assessment has also identified 12 potential options for additional candidate BSAs targeting the PCTs with the largest residual ecosystem liabilities. A combination these options can deliver between 82-99% of the residual credit liability for these PCTs, offering significant additional saving to the payment into the BCF.

The remaining portion of the proposed offset liability is predominantly associated with the TECs with limited distribution and higher land values located in the eastern portion of the alignment (EnergyConnect NSW – Eastern Section). This will likely be delivered through a residual payment into the BCF, primarily threatened species credits.

The current recommended offset liability of this mixed scenario is provided in Table 6.1 and is $128,937,511.

The previous liability estimate issued within the memo (PS113770-ECO-MEM-008) dated 21 May 2020 and scenario 2 of previous advice (Attachment B) of ~$79M was theoretically based on offset liability through BSAs for all credit liability. The results of the desktop analysis have confirmed that this assumed best-case scenario is unlikely to be achievable within the project timeframes and requires significantly greater land holdings than previously estimated and that are identified as available in the required region to meet the quantum of the credits required.

The current recommended offset liability is comparatively similar to the Scenario 3 outcome of previous advice (Attachment B) of ~$126M.

At all times, it is recommended to be proactive with both the State and Commonwealth determining authorities to ensure that the offsets outcomes that are to be provided will be acceptable as part of the EIS process.

A key component of this will be to commence consultation around the EnergyConnect program and legislative requirements to secure offsets prior to construction. TransGrid will require Ministerial discretion in relation to Clause 4, Division 4 Biodiversity assessment and offsets 7.14 State significant development or infrastructure of the BC Act.

Table 7.1 Summary of likely biodiversity offset liability for recommended BOS approach (for limited clearing scenario)

PROJECT CREDIT LIABILITY	CREDIT LIABILITY FOR LIMITED CLEARING (CREDITS)	OFFSET OPTION			TOTAL ECOSYSTEM COST	RESIDUAL BCF PAYMENT (SPECIES)[8]	TOTAL COST
		BSA CREDITS [redacted]	ADDITIONAL BSA ON PREFERRED OPTION 12 AND 8	RESIDUAL BCF PAYMENT[9]			
Total Credit Liability[1]	29,380	42,764[2]	10,208[2]	5,574	NA		
OFFSET COSTS							
Potential Offset Size (hectares)		[redacted]	[redacted]		-	-	-
Land Value ($)	NA	[redacted]	[redacted]		[redacted]	-	[redacted]
In perpetuity management ($)	NA	[redacted]	[redacted]		[redacted]	-	$53,773,262
Pay into BCF ($)	NA	NA	NA	$33,435,747	$33,435,747	$14,430,686	$47,866,433
Total cost of mixed option scenario					$114,506,825	$14,430,686	$128,937,511
Total cost of paying directly into the Biodiversity Conservation Fund to offset all credit liability without establishing a BSA					$235,609,278	$23,560,927	$259,170,206

Notes:

1) Assumes the clearing scenario as revised by TransGrid 4/8/20 and is based on desktop State-wide vegetation mapping for the entire EnergyConnect project alignment
2) BSA credits generated based on field verified vegetation mapping and a 4 credits per hectare for non-assisted regeneration.
3) Offset size based on combined Tareena and Pennington properties and for additional BSA is presumed best case outcome of property 12 and 8
4) Land value is based on sale price of $3,216,000 for Tareena and Pennington JLL report (dated August 2020)
5) Land value for additional BSAs at $2500 a hectare
6) In perpetuity management based on draft TFD for both Tareena and Pennington combined and assumes non-assisted regeneration.
7) In perpetuity management for additional BSAs assumes non-assisted regeneration and $2500 a ha
8) Additional species credit offsets estimated as approximately 13% of total ecosystem costs.
9) BOPC credit price as of 31/7/2020

7.1 MAXIMUM BIODIVERSITY OFFSET LIABILITY ESTIMATE

In order to provide the full picture a maximum biodiversity offset cost which assumes full clearing scenario (i.e. full impact clearing for the 60 m wide easement section and not the partial clearing scenario as outlined in section 1.2) has also been calculated. This is considered unlikely however still needs to be considered.

For the combined BSA/BCF approach this would equate to an offset liability of $257,840,692 with the BSA sites of [redacted] and additional BSAs on preferred option 12&8).

The same scenario for only paying into the BCF (i.e. no BSAs) would be $553,235,447. Table 6.2 provides the breakdown of costs.

Table 7.2 Summary of likely biodiversity offset liability for recommended BOS approach (for full clearing scenario)

Project credit liability	**Credit liability for Full Clearing (credits)**	**Offset option**			**Total Ecosystem cost**	**Residual BCF Payment (Species)[6]**	**Total Cost**
		BSA CREDITS [redacted]	**ADDITIONAL BSA ON PREFERRED OPTION 12 AND 8**	**RESIDUAL BCF PAYMENT[7]**			
Total Credit Liability[1]	62,788	42,764	19,236	18,418	NA		
OFFSET COSTS							
Potential Offset Size (hectares)		12,000	9632	NA	-	-	-
Land Value ($)	NA	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
In perpetuity management ($)	NA	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Pay into BCF ($)	NA	NA	NA	$160,751,963	$160,751,963	$16,075,196.	$176,827,159
Total cost of mixed option scenario					$241,823,041	$16,017,650	$257,840,692
Total cost of paying directly into the Biodiversity Conservation Fund to offset all credit liability without establishing a BSA					$502,941,315	$50,294,131	$553,235,447

Notes:
1) Assumes the clearing scenario as revised by TransGrid 4/8/20 and is based on desktop State-wide vegetation mapping for the entire EnergyConnect project alignment
2) BSA credits generated based on field verified vegetation mapping and a 4 credits per hectare for non-assisted regeneration.
3) Offset size based on combined Tareena and Big Bend properties
4) Land value is based on sale price of $3,216,000 for Tareena and Pennington JLL report (dated August 2020)
5) In perpetuity management based on draft TFD for both Tareena and Pennington combined and assumes non-assisted regeneration.
6) Additional species credit offsets estimated as approximately 6.5% of total ecosystem costs.
7) BOPC credit price as of 31/7/2020

8. BIODIVERSITY OFFSET LIABILITY ESTIMATE ASSUMPTIONS AND LIMITATIONS

The following details the assumptions and limitations to the liability calculations:

- The Biodiversity Assessment Method Calculator (BAM-C) (version 2.03) was not directly used to calculate biodiversity offset estimates due to the lack of available field data across the entire route at this early stage that would otherwise inform such calculations. Ultimately, the end ecosystem and species credit requirements and costs can only be known once all field work is completed. Completion of fieldwork could conclude that many PCTs are in disturbed condition (and therefore require less credits to offset the project impact). Until this fieldwork is complete, the calculations in this memo assume all impacted vegetation is at least in moderate to good condition.

- This estimate assumes that biodiversity offsets would also satisfy any requirements for threatened biodiversity listed under the Commonwealth *Environment Protection and Biodiversity Conservation Act*

1999 (EPBC Act). Specific PCT's are however identified to enable further consideration and impact minimisation for those Threatened Ecological Communities (TEC's) listed under the Commonwealth EPBC Act. This is because in some cases offsetting under the NSW system is not considered to be acceptable at a Commonwealth level if it is not exactly "like for like".

- Future surveys and results would determine exact and / or additional offset requirements at a State level (for species) or at a Commonwealth level (for species or ecosystems).
- At this stage the impact calculations include the relatively minor multiple route option deviations but as this memo is to enable a high-level estimate of potential offset costs, this conservative approach is appropriate.
- Based on field data collected across the project west, credits generated per hectare for full clearing are estimated for remnant moderate to good condition vegetation at 22-25 credits per hectare. For maintenance credit generating is based on 8-11 credit per ha.
- Vegetation mapping used for PCT mapping is the NSW State-based regional mapping, as detailed PCT mapping for the entire route is not yet available. Once the entire route has been mapped in detail that mapping would supersede the regional mapping and allow more accurate offset requirements to be determined.
- The Biodiversity Offsets Payment Calculator (BOP-C) was recently updated on July 31st 2020 and this included more specific ecosystem credit prices for each PCT. The credit prices used in this advice are current as of July 31st 2020 when they were obtained from the BOP-C.
- Where credits were available in Bionet and the BOP-C in multiple IBRA Bioregions or IBRA subregions, the likely more expensive regions were selected to ensure the credit price was likely to be a maximum credit price in the BOP-C for each PCT.
- Credit generation rates for Biodiversity Stewardship Agreement (BSA) sites are also conservative and only include Required Management Actions. Site-specific Active Restoration Management Actions may be able to be used on BSA sites which may increase the credits generated per hectare. Such outcomes cannot be known at this point in time.
- In addition to "ecosystem credits", "species credits" are required to offset impact to breeding habitat for threatened species. Threatened species considered to have breeding habitat within the project area (also known as candidate species) are still to be determined based on the findings of field investigations and detailed BAM calculations. To account for species credits within offset liability approximately 13% of the total ecosystem credit liability was applied to the limited clearing scenario and 6.5 % for the Full clearing scenario. An approximate 50% reduction in the % of the total ecosystem liability applied to the Full clearing scenario was applied as there is only a reduced probability of the larger area of clearing under this scenario accruing species offset liabilities at the same density.
- The assumptions and the related arguments in relation to the Clearing Scenario would need to be justified and agreed to by DPIE (BCD) to be successful. End offset outcomes could be consistent with the below approach or could be a variation on these depending on what DPIE considers is a reasonable and justifiable outcome once they have the detailed information.
- The alternative approach to sourcing offsets presented in this memo consists primarily of sourcing project-specific offsets. Assumptions used for this approach include:
  - An average land value price of [redacted] for land purchase
  - Approximately [redacted] for in perpetuity management of good condition vegetation. The management price is based on our previous experience for large scale offsets sites in NSW. If the condition of the proposed offset sites vegetation is in poor to moderate condition this can increase significantly

  - The BSA would generate approximately 4 credit per ha (based on already being in at least moderate condition and not being subject to any Active Restoration Management Actions
  - A maximum of two additional BSAs would be established
  - Excludes BSA identification, survey, reporting and legal establishment costs.
- The potential for funding of strategic or supplementary biodiversity measures as approved by the Secretary also cannot be excluded as an alternative option. Such measures would likely only be able to satisfy a maximum of 10% of total offset requirements and whether this results in a material change to overall biodiversity offset cost cannot be known at this point in time.
- More accurate information will become available during the project lifetime and with each step certainty will increase in relation to biodiversity offset requirements. In the interim it is considered that this memo contains reliable information that can guide TransGrid in decision making as required at this early stage.
- In preparing this report, WSP has relied upon documents, data, reports and other information (both written and verbal) provided by TransGrid. To the extent that the statements, opinions, facts, information, conclusions and/or recommendations in this report are based in whole or part on the information, those conclusions are contingent upon the accuracy and completeness of the information provided. WSP will not be liable in relation to incorrect conclusions should any information be incorrect or have been concealed, withheld, misrepresented or otherwise not fully disclosed to WSP. The assessment and conclusions are indicative of the situation at the time of preparing the report. Within the limitations imposed by the scope of services and the assessment of the data, the preparation of this report has been undertaken and performed in a professional manner, in accordance with generally accepted practices and using a degree of skill and care ordinarily exercised by reputable consultants under similar circumstances. No other warranty, expressed or implied, is made.

Sincerely

Alex Cockerill
Ecology National Team Executive
+61 2 49298333
Alex.Cockerill@wsp.com

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APPENDIX C MANAGEMENT ACTIONS AND TOTAL FUND DEPOSIT FOR THE BSA

C.1 MANAGEMENT ACTIONS

The required management actions that can create biodiversity credits are set out in Table 6 of the BAM and are reproduced in Table B.1 below. These are the management actions that must be undertaken.

Table C.1 Required management actions

MANAGEMENT ACTION	TYPES OF MANAGEMENT ACTIVITIES THAT MAY BE UNDERTAKEN
Preparation of a management plan	Preparation of a management plan for the biodiversity stewardship agreement for the site
Fire management	Undertake ecological burning activities Prevention of fire
Grazing management	Fencing to exclude stock Strategic grazing of stock
Native vegetation management	Restore/rehabilitate native vegetation Retain and manage regrowth Undertake nutrient control Threatened species habitat management activities related to native vegetation
Threatened species habitat management	Protection of breeding habitat features or sites Undertake any other required management action identified in the Threatened Biodiversity Data Collection to create species credits or ecosystem credits required for that threatened species
Integrated pest animal control	Undertake feral pest management including control of foxes, cats, pigs, goats, avian pests, horses and any other miscellaneous species as required
Integrated weed management and control of high threat weeds	Undertake weed management and activities to control high threat exotic and other exotic vegetation Fine-scale intensive removal of high threat exotic and other exotic vegetation
Management of human disturbance	Exclude development and clearing activities except those listed as permissible in the biodiversity stewardship agreement Identify sensitive locations and protect from disturbance Undertake rubbish removal Implement measures to restrict access to the site where necessary (vehicles, etc.)
Monitoring	Monitoring for evidence of disease Assessment of the management plan and activities against the performance measures Establishment of permanent plots to provide a baseline for assessing biodiversity outcomes Establishment of 360° photo points Review of the management plan and management activities

C.2 TOTAL FUND DEPOSIT

An example Total Fund Deposit worksheet for the BSA is provided on the next page to show the likely cost of management action.