



Your ref: SSI-65020460
Our ref: DOC24/790640-13

Mr Benjamin Cox
Principal Planning Officer
Department of Planning, Housing and Infrastructure
PO Box 5022
PARRAMATTA NSW 2150

By email: ben.cox@planning.nsw.gov.au

Dear Mr Cox

Subject: Clarrie Hall Dam Wall Raising Environmental Impact Statement (EIS) (SSI-65020460)

Thank you for your referral in the Major Projects Planning Portal dated 26 September 2024 seeking advice from the Biodiversity, Conservation and Science Group (BCS) of the NSW Department of Climate Change, Energy, the Environment and Water (DCCEEW) on the EIS for the Clarrie Hall Dam Wall Raising project.

This is a joint response from BCS and the National Parks and Wildlife Service (NPWS) in DCCEEW.

We have reviewed the exhibited EIS against the Secretary's Environmental Assessment Requirements (SEARs) provided by the Department of Planning, Housing and Infrastructure (DPHI) to the proponent on 31 May 2024.

We consider the EIS **does not** meet the Secretary's requirements for biodiversity or NPWS-managed lands.

In summary, the proponent needs to address the following issues:

NPWS

- Commit to additional biodiversity offsets to compensate for encroachment on Mount Jerusalem National Park.

Biodiversity

- Ensure the Biodiversity Assessment Method Calculator (BAM-C) import data accords with the Biodiversity Assessment Method (BAM) 2020 plot data.
- Consider the project impacts on the short-footed screw fern.
- Revise the species polygon for finger fern using the area unit of measure.
- Ensure the species polygon for pouched frog encompasses all records of the species on the subject land.
- Revise the giant barred frog species polygon to accord with the published survey guidelines.
- Consider other potential rock sources for construction.
- Consider using rock quarry haul road option 2 to minimise biodiversity impacts.

- Further reduce the development footprint around the dam wall construction zone.
- Consider staging future dam water levels in response to current or predicted short-term community water demands.
- Obtain additional biodiversity credits to compensate for residual indirect impacts.

A summary of our assessment and advice is provided in **Attachment A**. Detailed comments are provided in **Attachments B and C**.

If you have any questions about this advice, please do not hesitate to contact Mr Dimitri Young, Senior Team Leader Planning North East, BCS, via dimitri.young@environment.nsw.gov.au or 6659 8272.

Yours sincerely



GABRIELLE PIETRINI
Director North East
Biodiversity, Conservation and Science

4 December 2024

Enclosures:

Attachment A: BCS and NPWS Assessment Summary for Clarrie Hall Dam Raising Environmental Impact Statement (SSI-65020460)

Attachment B: Serious and Irreversible Impacts – Advice on SAI Entities

Attachment C: Detailed comments for Clarrie Hall Dam Raising Environmental Impact Statement (SSI-65020460)

ATTACHMENT A

BCS and NPWS Assessment Summary for Clarrie Hall Dam Raising Environmental Impact Statement (SSI-65020460)

In preparing this advice BCS has reviewed the following documents:

- Clarrie Hall Dam Raising Environmental Impact Statement, Kellogg Brown and Root Pty. Ltd., September 2024
- Biodiversity Development Assessment Report, EMM, September 2024
- Strategic Bushfire Study, Cool Burn Fire and Ecology, August 2024
- Clarrie Hall Dam Raising Flood Impact Assessment, Kellogg Brown and Root Pty. Ltd, August 2024
- Clarrie Hall Dam Concept Design Report, Public Works Advisory, October 2018

Key issues raised by BCS and NPWS are summarised below. These issues and recommendations are detailed in **Attachment C**, along with other minor issues, all of which need to be addressed prior to determination of the State Significant Infrastructure (SSI) application.

Key NPWS Assessment Issue

<i>Additional biodiversity offsets are required to compensate for encroachment on Mount Jerusalem National Park</i>	Biodiversity offsets required in accordance with the <i>Biodiversity Conservation Act 2016</i> are separate to and in addition to the compensation required to revoke part of Mount Jerusalem National Park. Recommended action: 1. The proponent considers the NPWS Revocation, recategorisation and road adjustment policy in identifying suitable compensation for revoking part of Mount Jerusalem National Park and note that this compensation is separate and in addition to the biodiversity offset strategy.
<i>Extent and Timing</i>	Pre-determination

Key BCS Assessment Issues

<i>BAM-C import data must be complete and assigned to the appropriate vegetation zone</i>	BAM Plot 6 is missing from the BAM-C import data. Also, BAM Plot 6 was collected from the 827_burnt vegetation zone (VZ) rather than the 827_high VZ as indicated in the Biodiversity Development Assessment Report (BDAR). Recommended action: 6. The BAM-C and BDAR be revised to either include the BAM Plot 6 data collected by EcoLogical in the BAM-C import dataset or remove references to the BAM Plot 6 data being used to inform the Vegetation Integrity (VI) score of the 827_high VZ if the plot data had not been collected from that VZ.
<i>Extent and Timing</i>	Pre-determination

<i>Project impacts on the short-footed screw fern need to be considered</i>	The BDAR has not included a species polygon for the threatened flora species, short-footed screw fern (<i>Lindsaea brachypoda</i>), despite it having been recorded in the proposed disturbance footprint. Recommended action: 8. The BAM-C be revised to include short-footed screw fern (<i>Lindsaea brachypoda</i>) as a species credit species confirmed present on the subject land.
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	9. The BDAR be revised to acknowledge the presence of short-footed screw fern (<i>Lindsaea brachypoda</i>) on the subject land and include a species polygon for the species.
<i>Extent and Timing</i>	Pre-determination

<i>The species polygon for finger fern needs to use the area unit of measure</i>	The BDAR includes a species polygon for finger fern using the count unit of measure instead of the area unit of measure. Recommended action: 10. The species polygon for finger fern be revised to use the area unit of measure, incorporating all areas with suitable habitat features within vegetation zones on the subject land in which the species has been recorded.
<i>Extent and Timing</i>	Pre-determination

<i>The species polygon for pouched frog is to include all records of the species on the subject land</i>	The most northern record of the species on the subject land is located outside the species polygon, which indicates the species polygon has not included all areas of suitable habitat for the species on the subject land. Recommended action: 11. The species polygon for the pouched frog be revised to include all records of the species on the subject land.
<i>Extent and Timing</i>	Pre-determination

<i>The giant barred frog species polygon is to accord with the published guidelines</i>	The species polygon provided for the giant barred frog in the BDAR does not accord with the requirements detailed in the <i>NSW Survey Guide for Threatened Frogs – A guide for the survey of threatened frogs and their habitats for the BAM</i> (DPIE 2020). Recommended action: 12. The species polygon for the giant barred frog be extended to include all Plant Community Types (PCTs) associated with the species within 50m of the aquatic habitat directly linked to the species records, noting the 50m buffer is to be applied to the aquatic habitat rather than the species records.
<i>Extent and Timing</i>	Pre-determination

<i>Review is required to identify and rectify discrepancies in the quantum of direct impacts</i>	There are discrepancies between the quantum of impacts for threatened species stated in the BDAR and the quantum of impacts used in the BAM-C to determine the biodiversity credit offset obligations. Recommended action: 14. The BDAR and BAM-C be reviewed to identify and rectify all discrepancies in direct impact values for threatened species.
<i>Extent and Timing</i>	Pre-determination

<i>Further comparative analysis of biodiversity impacts associated with different dam wall heights is required</i>	The BDAR has only compared the relative proportion of biodiversity impact for wall heights to achieve a full supply level (FSL) of 70 m Australian Height Datum (AHD) or higher. The BDAR has not presented a comparison of biodiversity impacts for wall heights with an FSL below 70 m to demonstrate the adequacy of measures to avoid and minimise biodiversity impacts. Recommended action:
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	15. The BDAR be revised to include a comparative analysis of potential biodiversity impact inflection points for a range of dam wall heights between the existing wall height of 61.5 m AHD and the proposed 70 m AHD wall height.
<i>Extent and Timing</i>	Pre-determination

<i>Other potential rock sources for construction should be considered</i>	The proposal to reinstate the rock quarry on the subject land to source rock for construction will impact on known habitat for several threatened flora and fauna species, and impact numerous records of the critically endangered scrub turpentine (<i>Rhodamnia rubescens</i>) and an entire local population of the endangered basket fern (<i>Drynaria rigidula</i>). The BDAR does not include a comparative analysis of alternative rock sources and their biodiversity impacts to demonstrate that reinstating the rock quarry would have the least biodiversity impacts. Recommended actions: 16. The BDAR be revised to include a comparative analysis of potential alternative rock sources and their biodiversity impacts to justify reinstating the existing rock quarry on the subject land. 17. If the analysis of alternative rock sources and their biodiversity impacts concludes that reinstating the existing rock quarry is justified, then the proponent investigates opportunities to further refine the proposed rock quarry footprint to avoid as many threatened species and their habitat as possible, particularly scrub turpentine, green-leaved rose walnut and basket fern.
<i>Extent and Timing</i>	Pre-determination

<i>Using rock quarry haul road option 2 would minimise biodiversity impacts</i>	The EIS and BDAR identify two options for the proposed rock quarry haul road route. Haul road option 1 would remove significantly more native vegetation and threatened species habitat and lead to greater long-term edge effects than option 2. Recommended action: 18. Haul road option 2 be adopted as part of the project design to minimise direct and indirect biodiversity impacts.
<i>Extent and Timing</i>	Pre-determination

<i>Opportunities to further reduce the development footprint around the dam wall construction zone need to be considered</i>	The mapped construction disturbance area around the dam wall extends well beyond the various construction components of the project. Recommended action: 19. The project development footprint around the rock quarry haul road, new spillway and realigned Clarrie Hall Dam Road be further refined and detailed in the BDAR to avoid biodiversity impacts.
<i>Extent and Timing</i>	Pre-determination

<i>Staging the dam water level increases in response to current or near future predicted</i>	The project involves filling the dam from its current capacity of 16,000 ML to a FSL of 42,300 ML upon completion, resulting an extensive area of threatened species habitat being inundated to achieve a full storage capacity, even though that storage capacity may not be required for several decades. Recommended action:
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<i>community water demand will minimise impacts on threatened entities</i>	20. Dam water levels be increased incrementally to cater for gradually increasing water demand rather than immediately filling the upgraded dam to the 42,300 ML FSL, with consideration given to staging the retirement of biodiversity credits to accord with the impacts of each incremental increase in dam water level.
<i>Extent and Timing</i>	Pre-determination

<i>Additional biodiversity credits are required to compensate for residual indirect impacts</i>	Vegetation clearing to construction the upgraded dam wall will create several thousand metres of new forest edge, which will result in residual long-term indirect impacts on vegetation condition and habitat quality within retained forest areas along the new forest edge. Recommended action: 28. The BDAR be revised to include additional biodiversity credits to compensate for residual indirect impacts from vegetation clearing during the project construction phase.
<i>Extent and Timing</i>	Pre-determination

ATTACHMENT B Serious and Irreversible Impacts (SII) – Advice on SII Entities

SII Entities: Mitchell's rainforest snail (*Thersites mitchellae*), sooty owl (*Tyto tenebricosa*), corokia (*Corokia whiteana*), basket fern (*Drynaria rigidula*), green-leaved rose walnut (*Endiandra muelleri* subsp. *bracteata*), fine-leaved tuckeroo (*Lepiderema pulchella*), scrub turpentine (*Rhodamnia rubescens*), native guava (*Rhodomyrtus psidioides*) and durobby (*Syzygium moorei*).

	Steps	BCS Recommendation
1	Identify relevant entities at risk of SII	The candidate SII entities assessed in the BDAR accord with the BAM. The assessor has provided sufficient consideration and explanation to justify the SII entities selected for further assessment.
2	Evaluation of the current extinction risk of the impacted entities	BCS considers the assessor's evaluation of the current extinction risk for each SII entity recorded on the subject land to be adequate. Mitchell's rainforest snail The Mitchell's rainforest snail meets SII principle 1 – species currently in a rapid decline, and principle 3 – species with very limited geographic distribution as set out in clause 6.7 of the Biodiversity Conservation Regulation 2017. The species was formerly common in suitable habitat from the Tweed River south to Ballina, but recently has been reduced greatly in distribution and abundance to occupy two remnant, disjunct populations. Land clearing has been extensive within the species' range, with at least 90% of the original lowland rainforest and swamp sclerophyll forest destroyed. Mitchell's rainforest snail is now restricted to remnant areas of habitat, many of which are of limited size. The estimated extent of occurrence for the species is 400 km², with an estimated area of occupancy of less than 5 km². Sooty owl The sooty owl meets SII principle 4 – the species is unlikely to respond to management as set out in clause 6.7 of the Biodiversity Conservation Regulation 2017. Sooty owls require key characteristics for their breeding habitat that are not easily replaced, including: • large areas of mature forest stands containing large hollow trees, in moist gullies, • a multi-layered forest containing a rainforest element of dense mid-storey trees and shrubs, • a high density and diversity of small forest mammals, some of which can be hollow-dependent or require old-growth forest attributes Corokia Corokia meets SII principle 2 – species with a very small population size, and principle 3 – species with very limited geographic distribution as set out in clause 6.7 of the Biodiversity Conservation Regulation 2017.

	Steps	BCS Recommendation
		The species has been listed as endangered because: - the area of occupancy of the species is highly restricted; and - it is severely fragmented with a future projected decline in extent of occupancy, area of occupancy, quality of habitat, number of subpopulations and number of mature individuals. Basket fern Basket fern meets SAI principle 2 – species with a very small population size, and principle 3 – species with very limited geographic distribution as set out in clause 6.7 of the Biodiversity Conservation Regulation 2017. Each of the very limited number of known populations of the species consists of either one or a very small number of individuals. In NSW, it is only found north of the Clarence River, in a few locations at Maclean, Bogangar, Byron Bay, Mullumbimby, in the Tweed Valley and at Woodenbong. Green-leaved rose walnut Green-leaved rose walnut meets SAI principle 1 – species currently in rapid decline as set out in clause 6.7 of the Biodiversity Conservation Regulation 2017. The Threatened Biodiversity Data Collection (TBDC) indicates the species has experienced a reduction in population size of up to 80% in the last 10 years or three generations. Fine-leaved tuckeroo Information in the TBDC indicates fine-leaved tuckeroo meets SAI principle 2 – species with a very small population size, and principle 3 – species with very limited geographic distribution as set out in clause 6.7 of the Biodiversity Conservation Regulation 2017. The population is estimated to be less than 250 individuals, with the number of adult trees in individual sites being mostly less than 20. The species is found on the NSW north coast, north of Brunswick Heads, with most records in NSW from the Tweed Valley, and most known populations occurring on private land. Scrub turpentine and native guava Scrub turpentine and native guava meet SAI principle 1 – species currently in rapid decline, and principle 4 – the species is unlikely to respond to management as set out in clause 6.7 of the Biodiversity Conservation Regulation 2017. Both species are highly susceptible to the exotic pathogen, myrtle rust (<i>Austropuccinia psidii</i>). The impact of myrtle rust infection on these species is severe across their entire range based on quantitative evidence from field surveys. A greater than 80% reduction in the population of the species across Australia over the three generations is projected given documented levels of mortality due to myrtle rust infection, with

	Steps	BCS Recommendation
		high susceptibility evident in both mature individuals and seedlings. There is currently no effective broad-scale treatment available to combat myrtle rust infection in either species. Durobbby Information in the TBDC indicates fine-leaved tuckeroo meets SAIL principle 1 – species currently in rapid decline, principle 2 – species with a very small population size, and principle 3 – species with very limited geographic distribution as set out in clause 6.7 of the Biodiversity Conservation Regulation 2017. The species' small population size can be attributed to most of its lowland rainforest habitat having been cleared by 1900. The species is now restricted to the Richmond, Tweed and Brunswick River valleys in north-east NSW.
3	Detail measures taken to avoid impacts on the entity	For most of the SAIL entities considered, the assessor has demonstrated how direct impacts have been avoided through the placement of the concrete batching plant, workforce accommodation, the McCabes Bridge stockpile and construction office complex. The BDAR has presented the selected dam wall height to achieve a FSL of 70 m AHD as an avoidance measure. The BDAR states that alternative dam wall heights for the project were investigated, with a FSL of 70 m AHD presenting significantly less biodiversity impact than larger wall heights. However, as dam wall heights above a FSL of 70 m AHD have significant engineering and cost constraints, indicating they are not feasible options, this cannot be presented as a valid avoidance measure. The project has not demonstrated any avoidance for basket fern, which will have all known habitat on the subject land removed by the project as part of reinstating the rock quarry.
4	Evaluate the impacts from the proposal	Mitchell's rainforest snail Inundation resulting from the proposed increased dam capacity is expected to remove up to 2.2 ha of habitat for the species, which the assessor has estimated to support less than 100 individuals. The proponent has proposed to translocate individuals from the inundation area as a measure to prevent habitat fragmentation. However, translocating a small number of detectable individuals will not prevent habitat fragmentation, particularly given undetected individuals will most likely remain in any portion of habitat isolated by the inundation. The project is expected to reduce the area of occupancy of the species, further reducing its limited geographic range (i.e. Principle 3) and so increasing the Mitchell's rainforest snail's extinction risk. Sooty owl The project is expected to remove 52.65 ha of sooty owl habitat. Given the large home range and high mobility of the species, large tracts of suitable breeding and foraging habitat will be

	Steps	BCS Recommendation
		retained within extensive contiguous forested areas. The project is unlikely to increase the sooty owl's extinction risk. Corokia The project would remove 12 individuals of corokia from the subject land, which equates to 38% of the known sub-population. The project would reduce the local population size of the species. However, it would not impact on the species' extent of occurrence or area of occupancy, and so it would be unlikely to increase the corokia's extinction risk. Basket fern The proposal to reinstate the rock quarry to source rock for construction will remove all known habitat for the species from the subject land, which equates to 0.5 ha. As the extinction risk factors for the species relate to small population size and limited geographic range, the project is likely to increase the basket fern's extinction risk. Green-leaved rose walnut The project is expected to remove 457 individuals of the species, which represents approximately 59% of the known local population (i.e. 322 individuals were recorded beyond the development footprint). As the extinction risk factor for the species relates to a rapidly declining population size, the project is likely to increase the Green-leaved rose walnut's extinction risk. Fine-leaved tuckeroo The project is expected to remove 15 individuals of fine-leaved tuckeroo, which represents the known local population of the species. As the extinction risk factors for the species relate to small population size and limited geographic range, the proposed removal of the local population on the subject land is likely to increase the fine-leaved tuckeroo's extinction risk. Scrub turpentine The project is expected to remove 709 individuals of scrub turpentine, which represents approximately 7.1% of the estimated total population of 10,000 individuals. As one of the extinction risk factors for the species relates to a rapidly declining population size, the project is likely to increase the scrub turpentine's extinction risk. Native guava The project is expected to remove 95.53 ha of native guava occupied habitat. As one of the extinction risk factors for the species relates to a rapidly declining population size, the project is likely to increase the native guava's extinction risk. Durobby The project is expected to remove 18 individuals of durobby, which are thought to be planted individuals and associated self-seeded individuals. The project is unlikely to reduce the extent of occurrence or area of occupancy for the species, hence is also unlikely to increase the durobby's extinction risk.

	Steps	BCS Recommendation
5	Provide advice on whether the proposal is likely or unlikely to result in SAI	Mitchell's rainforest snail The proposal is likely to exacerbate SAI principle 3 by reducing the area of occupancy of the species and increasing its extinction risk. Therefore, the project is likely to have a SAI on Mitchell's rainforest snail. Sooty owl The proposal is expected to remove 52.65 ha of habitat for the sooty owl. The impact is unlikely to have a SAI on sooty owl given large tracts of suitable breeding and foraging habitat for this highly mobile species will be retained within extensive contiguous forested areas. Corokia The proposal is unlikely to have a SAI on corokia given the very small proportion of the population affected by the project and negligible impact on the species extent of occurrence and area of occupancy. Basket fern The proposal is likely to have a SAI on basket fern because the project will remove the known local population of the species, exacerbating both SAI principles 2 and 3. Green-leaved rose walnut The proposal will remove 457 individuals of green-leaved rose walnut and exacerbate SAI principle 1, which is likely to have a SAI on the species given it will contribute to the already rapid decline of the species' population. Fine-leaved tuckeroo The project will remove the known local population of the species and reduce its area of occupancy, exacerbating SAI principle 3. Given this, based on the information contained in the TBDC and the NSW Threatened Species Scientific Committee determination, the proposal is likely to have a SAI on fine-leaved tuckeroo. Scrub turpentine The proposal will remove 709 individuals of scrub turpentine, and this is likely to have a SAI on the species given it will contribute to the already rapid decline of the species' population and remove a large proportion of the known local population. Native guava The proposal will remove 95.53 ha of occupied native guava habitat, which is likely to have a SAI on the species given it will contribute to the already rapid decline of the species' population and remove a large proportion of the known local population. The entire population on the subject land appears to be affected by myrtle rust and may not be capable of reproducing at the present time. However, individuals may persist for an extended period in which ongoing research could lead to more effective treatments for the pathogen.

	Steps	BCS Recommendation
		Durobby The proposal is unlikely to have a SAI on durobby as a small number of individuals will be removed, which will not impact the species' extent of occurrence or area of occupancy.
Other Recommendations/Comments		
1	BCS recommends several options for redesigning and/or staging the project to reduce potential impacts on SAI entities, including: Staging dam water level increases in response to current or near future predicted community water demands Increasing water levels in the upgraded dam incrementally to cater for gradually increasing community water demand rather than immediately filling the upgraded dam to the 42,300 ML FSL would slow the rate of permanent inundation. This would provide more time for threatened flora and fauna populations to adapt and migrate in response to incremental habitat loss. It would also provide significantly more time to implement the proposed mitigation measures involving seed collection and assisted establishment of threatened flora species beyond the future FSL. Refining the footprint of the proposed reinstated rock quarry and/or using alternative rock sources for construction The current footprint of the proposed reinstated rock quarry would remove individuals and habitat for several SAI entities including scrub turpentine, green-leaved rose walnut and basket fern. Impacts on SAI entities could be reduced through further investigating alternative sources of rock instead of, or in conjunction with, more detailed analysis of the on-site rock quarry resource in relation to locations of SAI entities. Using rock quarry haul road option 2 The EIS and BDAR identify two options for the proposed rock quarry haul road route. Haul road option 1 would remove more individuals of, and habitat for SAI entities than option 2. Adopting haul road option 2 would retain more scrub turpentine and green-leaved rose walnut individuals. Reducing the development footprint around the dam wall construction zone The mapped construction disturbance area around the dam wall appears to extend well beyond the various construction components of the project, particularly if haul road option 2 is adopted. Biodiversity credit obligations calculated in the BAM-C and presented in the BDAR have been based on a larger construction disturbance area, which indicates there may be opportunities for the proponent to further avoid impacts on SAI entities by refining and confirming the actual development/clearing footprint.	

ATTACHMENT C Detailed comments for Clarrie Hall Dam Raising Environmental Impact Statement (SSI-65020460)

National Parks and Wildlife Service

NPWS has a statutory obligation to ensure developments do not adversely affect the values or management of lands reserved (Part 4) under the *National Parks and Wildlife Act 1974* (NPW Act).

The SEARs as issued on 31 May 2024 include a requirement for the proponent to assess impacts on environmentally sensitive land (including protected areas) managed by NPWS and engage with NPWS. NPWS advises that Tweed Shire Council (Council) has complied with the SEARs around engagement on the scheme.

NPWS's primary interest is in relation to the operational footprint of the project, as the new FSL is proposed to inundate part of Mount Jerusalem National Park.

NPWS recognises that impacts are not anticipated during construction or operation to either Nightcap National Park (located 2.4 km south of the development footprint) or Wollumbin National Park (located 2.3 km to the north-west).

On review of the EIS, NPWS raises the matters below.

Additional offsets are required to compensate for encroaching on Mount Jerusalem National Park

NPWS acknowledges that approximately 1.91 hectares of Mount Jerusalem National Park was revoked through the *National Parks and Wildlife Legislation Amendment (Reservations) Act 2020*¹, which was passed by the NSW Government and assented to on 25 November 2020. The revoked land is vested in the Minister administering the NPW Act. NPWS is currently in negotiations with Council to seek compensation for the revoked land, consistent with the [NPWS Revocation, recategorisation and road adjustment policy](#)².

The EIS recognises that, once the land transfer has been completed, no direct impacts to Mount Jerusalem National Park are anticipated. Indirect impacts have been assessed, consistent with the BAM.

As detailed within the EIS and BDAR, the disturbance footprint of the project will generate an offset requirement in accordance with the Biodiversity Offset Scheme (BOS).

NPWS highlights that Paragraph 17 of the [NPWS Revocation, recategorisation and road adjustment policy](#) states that land subject to a statutory offsetting arrangement (such as under the BOS) is not eligible to be considered as compensation for park revocations.

Recommended action:

1. The proponent considers the [NPWS Revocation, recategorisation and road adjustment policy](#) in identifying suitable compensation for revoking part of Mount Jerusalem National Park and note that this compensation is separate and in addition to the biodiversity offset strategy.

The State Heritage listing of High Conservation Value Old Growth Forest (SHR no. 01487) mapping requires correction

The EIS and the Historic Heritage Report at Appendix K recognise that Mount Jerusalem National Park includes part of the curtilage of the High Conservation Value Old Growth Forest State heritage item (SHR no. 01487). The EIS and the Historic Heritage Report are incorrect in stating that SHR no. 01487 is locally restricted to Mount Jerusalem and Nightcap National Parks. While the original listing may have been restricted to the current boundaries of these parks, there was no change to the listing to reflect the outcomes of revoking 1.91 hectares from Mount Jerusalem National Park.

¹ <https://legislation.nsw.gov.au/view/pdf/asmade/act-2020-38>

² www.environment.nsw.gov.au/topics/parks-reserves-and-protected-areas/park-policies/revocation-recategorisation-and-road-adjustment

NPWS highlights that the mapping of this item's curtilage in the Historic Heritage Report (Figure 1.3, page 10) is not consistent with the mapping in the State Heritage Inventory³ or that is available on SEED⁴.

This means the EIS does not correctly identify that a small area of land revoked from Mount Jerusalem National Park to accommodate the new FSL is covered by the mapping of the item's curtilage and so the development footprint overlaps SHR no. 01487 (see Figure 1 below).

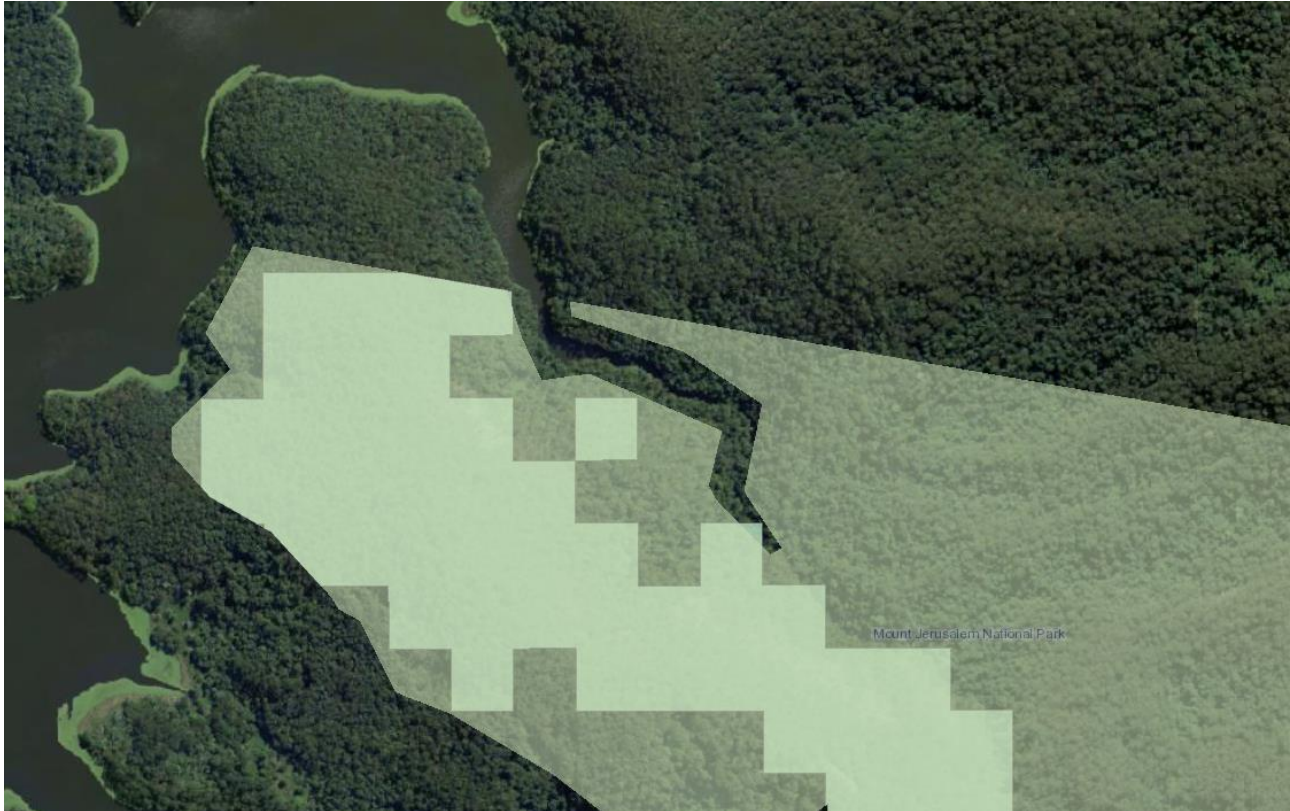


Figure 1: SHR no. 01487 curtilage (solid light green) in relation to current boundary of Mount Jerusalem National Park (paler green) following the 2020 revocation of 1.91 hectares from the park (SEED Map, NSW Government)

Recommended action:

2. As part of the RTS, the proponent:
 - a. Identifies the portion of SHR no. 01487 that is no longer in Mount Jerusalem National Park and so lies within the development footprint
 - b. Assesses the potential heritage impacts of the new FSL to this section of the curtilage of SHR no. 01487.

The requirements relating to owner's consent from NPWS do not appear to have been satisfied

Part of the development footprint encroaches into land vested in the Minister for the Environment under Part 11 of the NPW Act.

The EIS in Appendix C (Table C-2) identifies the proponent will meet the requirements for SSI relating to owner consent under section 181(6) of the Environmental Planning and Assessment Regulation 2021 (EP&A Regulation), which states:

- (6) *The proponent of State significant infrastructure specified in subsection (5) must—*
 - (a) *arrange for the Minister to publish notice of the application on the NSW planning portal, and*
 - (b) *give notice of the application during the relevant period by—*
 - (i) *giving written notice to the owner of the land, or*

³ www.hms.heritage.nsw.gov.au/App/Item/ViewItem?itemId=5051503

⁴ At <https://datasets.seed.nsw.gov.au/dataset/state-heritage-register-curtilages1c5ee>

(ii) an advertisement published in a newspaper circulating in the area in which the infrastructure will be carried out.

NPWS highlights that, if the proponent opted to give notice to landowners under section 181(6)(b)(i), that notice should have been sent to the NSW Minister for the Environment as landowner for all lands reserved or acquired under the NPW Act.

Recommended action:

3. As part of the RTS, the proponent confirms that the requirements of the EP&A Regulation section 181(6) were completed.

Biodiversity

The BDAR in Appendix H of the EIS does not meet the Secretary's requirements for biodiversity.

Digital shapefiles need to show all components of the development footprint and areas of direct and indirect impact

The minimum information requirements for a BDAR specified in Appendix K of the BAM include supplying digital shape files for the development footprint and the direct and indirect impact zones. The GIS layer titled 'Development Site Features', which illustrates the various components of the proposal within the development footprint does not show the location and extent of the proposed realignment of Clarrie Hall Dam Road (see Figure 2 below).



Figure 2: The proposal on the left is from the BDAR, which shows the existing Clarrie Hall Dam alignment. The image on the right is from the concept design report, which shows the extent of the proposed road realignment.

Recommended action:

4. The GIS layer titled 'Development Site Features' be revised to show the location and extent of the proposed realignment of Clarrie Hall Dam Road.

BAM-C import data must accord with the BAM plot data

Section 4.3.4 of the BAM requires the assessor to correctly assess the composition and cover attributes within each BAM plot. The BDAR has relied on BAM plot data collected by both EcoLogical and EMM. However, the BAM plot data collected by EcoLogical in Appendix A of the BDAR is not consistent with the BAM-C import data contained in Table D1 of the BDAR. The inconsistencies relate mainly to the composition and structure scores for the 'forb' and 'other' growth forms. BCS identified inconsistencies for BAM plot numbers 3, 4, 5, 7, 9, 10, 11, 12, 13, 17, 18, 24, 25, 26, 28 and 31.

Recommended action:

5. The BAM-C import dataset be reviewed to ensure it is consistent with the BAM plot data collected by EcoLogical.

BAM-C upload plot data needs to be complete and assigned to the appropriate vegetation zone (VZ)

Table 4.6 (page 36) of the BDAR indicates BAM Plot 6, collected by EcoLogical, was used in conjunction with two other BAM plots to inform the VI score for the 827_high VZ. BAM Plot 6 is not in the BAM-C import data in Table D1 of the BDAR, and so BCS is not clear how it would have informed the VI score for any VZ. In addition to this, the final page of the EcoLogical report in Appendix B of the BDAR, indicates BAM Plot 6 was collected from the 827_burnt VZ rather than 827_high VZ.

Recommended action:

6. The BAM-C and BDAR be revised to either include the BAM Plot 6 data collected by EcoLogical in the BAM-C import dataset or remove references to the BAM Plot 6 data being used to inform the VI score of the 827_high VZ if the plot data had not been collected from that VZ.

Habitat constraints in the BDAR and BAM-C need to be consistently assessed

Section 5.2.2 of the BAM requires the assessor to consider the presence or absence of habitat constraints, as listed on the TBDC, for each candidate threatened species when determining their likelihood of occurrence on site. Cliffs and/or escarpments are listed habitat constraints for several candidate threatened species in the BAM-C. The assessor has indicated cliffs and escarpments are present on the subject land as habitat constraints for some species (e.g. ravine orchid and needle-leaf fern), but not others for which cliffs or escarpments are a listed habitat constraint (e.g. Border Ranges daisy and large-eared pied bat).

It is also not clear why section 3.4 of the BDAR states there are no cliffs on the subject land.

Recommended action:

7. The BDAR and BAM-C be revised to ensure the presence or absence of cliffs and escarpments on the subject land is consistently assessed.

Project impacts on the short-footed screw fern needs to be consistent

Section 5.2.5 of the BAM requires the assessor to prepare a species polygon for each species credit species recorded or assumed to be present on the subject land. The BDAR has not included a species polygon for the threatened flora species, short-footed screw fern (*Lindsaea brachypoda*), despite it having been recorded in the proposed disturbance footprint during targeted flora surveys completed by Council in 2016 and 2017.

The BAM-C also considered the species as being not present on the subject land, so no biodiversity credit obligation has been generated for the project.

Recommended actions:

8. The BAM-C be revised to include short-footed screw fern (*Lindsaea brachypoda*) as a species credit species confirmed present on the subject land.
9. The BDAR be revised to acknowledge the presence of short-footed screw fern (*Lindsaea brachypoda*) on the subject land and include a species polygon for the species.

The species polygon for finger fern requires use of the area unit of measure

Finger fern (*Grammitis stenophylla*) has an area unit of measure for the purpose of preparing a species polygon. The BDAR includes a species polygon for finger fern using the count unit of measure. The BDAR states that none of the PCTs recorded on the subject land are noted in the TBDC as being associated with the species, which might be the reason the assessor has used the count unit of measure. Nevertheless, the count unit of measure is not to be used to generate a species polygon for a species requiring an area unit of measure.

Recommended action:

10. The species polygon for finger fern be revised to use the area unit of measure, incorporating all areas with suitable habitat features within vegetation zones on the subject land in which the species has been recorded.

The species polygon for pouched frog needs to include all records of the species on the subject land

Figure 5.31 of the BDAR illustrates the species polygon and records of the pouched frog (*Assa darlingtoni*) on the subject land. The most northern record of the species on the subject land is located outside the species polygon, which indicates the species polygon has not included all areas of suitable habitat for the species on the subject land.

Recommended action:

11. The species polygon for the pouched frog be revised to include all records of the species on the subject land.

The giant barred frog species polygon is to accord with DCCEEW published guidelines

According to the *NSW Survey Guide for Threatened Frogs – A guide for the survey of threatened frogs and their habitats for the BAM* (DPIE 2020), the species polygon for the giant barred frog (*Mixophyes iteratus*) needs to align with aquatic habitats linked directly to records of the species, plus a 50 m buffer to the aquatic habitats incorporating PCTs associated with the species, which is to be measured from the top of bank.

The species polygon provided for the giant barred frog in the BDAR does not accord with the guideline requirements (see Figure 3 below). Firstly, the buffer only extends 25 m from the centre of the watercourse rather than 50 m from the top of each bank. Secondly, the species polygon has not been aligned with the entire aquatic habitat linked to the records, particularly along vegetated sections of Commissioners Creek and upper reaches of Doon Doon Creek.



Figure 3: Part of the species polygon for the giant barred frog (orange area containing species records). Other coloured areas along the same section of stream also represent suitable habitat for the species.

Recommended action:

12. The species polygon for the giant barred frog be extended to include all PCTs associated with the species within 50 m of the aquatic habitat directly linked to the species records, noting the 50 m buffer is to be applied to the aquatic habitat rather than the species records.

Ensure the SAI principles listed for candidate species are consistent with those in the TBDC

Table 7.4 of the BDAR lists the candidate SAI species for the project, along with the relevant SAI principles for each species as identified in the TBDC. However, the principles listed in Table 7.4 of the BDAR for the threatened flora species, corokia, fine-leaved tuckeroo and durobby, are not consistent with the principles listed for each species in the TBDC.

Recommended action:

13. Table 7.4 of the BDAR be revised to list all the relevant SAI principles for corokia, fine-leaved tuckeroo and durobby as listed in the TBDC.

Review the quantum of direct impacts to identify and rectify discrepancies

BCS identified several discrepancies between the quantum of impacts for threatened species stated in the BDAR and the quantum of impacts used in the BAM-C to determine the biodiversity credit offset obligations. The discrepancies are detailed in Table 1 below:

Table 1: Discrepancies in the predicted quantum of impacts on EPBC Act listed threatened species between sections of the BDAR and the BAM-C.

EPBC Act threatened species	Significant impact assessment (BDAR section 9.1.2)	Summary of impacts (BDAR section 7.1.3)	BAM-C
Thorny Pea	3.3 ha	2.21 ha	2.2 ha
Giant Barred Frog	6.09 ha	6.09 ha	6.03 ha
Koala	160.87 ha	160.87 ha	159.7 ha
Southern Pink Underwing Moth	n/a	0.10 ha	0.09 ha
Grey-headed flying-fox	62.87 ha	n/a	164.5 ha
Native Guava	97.26 ha	95.53 ha	95.6 ha
Durobby	18 individuals	16 individuals	16 individuals

Recommended action:

14. Review the BDAR and BAM-C to identify and rectify all discrepancies in direct impact values for threatened species.

Complete further comparative analysis of biodiversity impacts associated with different dam wall heights

The assessor has demonstrated the efforts made to avoid direct impacts for the concrete batching plant, workforce accommodation, McCabes Bridge stockpile and construction office complex.

The BDAR also shows how the proponent has attempted to avoid biodiversity impacts through limiting the increased height of the dam wall to a FSL of 70 m AHD. The BDAR refers to analysis assessing the biodiversity impact inflection points for FSLs of 66 m, 70 m, 74 m and 77 m. The BDAR details the relative change in biodiversity impact for FSLs above 70 m and concludes that limiting the wall height to achieve an FSL of 70 m would avoid biodiversity impacts where possible.

Chapter 3 of the concept design report in Appendix B of the EIS noted that FSLs above 70 m would cause significant breakouts, requiring saddle dams which would be costly. Consequently, limiting the FSL at 70 m AHD is not a valid means of avoiding biodiversity impacts under the BAM because wall heights to achieve higher FSLs are cost prohibitive.

Although the BDAR states biodiversity impacts for a wall height at a FSL of 66 m were analysed, the results of the analysis at this height were not presented in the BDAR. Therefore, the BDAR has not included a comparison of biodiversity impacts for wall heights with an FSL below 70 m to demonstrate the adequacy of measures to avoid and minimise biodiversity impacts.

15. The BDAR be revised to include a comparative analysis of potential biodiversity impact inflection points for a range of dam wall heights between the existing wall height of 61.5 m AHD and the proposed 70 m AHD wall height.

The proposal to reinstate the rock quarry on the subject land to source rock for construction may represent an efficient use of resources. However, the former rock quarry site contains known habitat for several threatened flora and fauna species, including numerous records of the critically endangered scrub turpentine (*Rhodamnia rubescens*) and an entire local population of the endangered basket fern (*Drynaria rigidula*) (see Figure 4 below). The BDAR has not provided any comparative analysis of alternative rock sources and their biodiversity impacts to demonstrate that reinstating the rock quarry would have the least biodiversity impacts.



Recommended actions:

16. The BDAR be revised to include a comparative analysis of potential alternative rock sources and their biodiversity impacts to justify reinstating the existing rock quarry on the subject land.
17. If the analysis of alternative rock sources and their biodiversity impacts concludes reinstating the existing rock quarry is justified, then the proponent investigates opportunities to further refine the proposed rock quarry footprint to avoid as many threatened species and their habitat as possible, particularly scrub turpentine and basket fern.

The EIS and BDAR identify two options for the proposed rock quarry haul road route (see Figure 5 below). Haul road option 1 would remove significantly more native vegetation and threatened species habitat and lead to greater long-term edge effects than option 2.

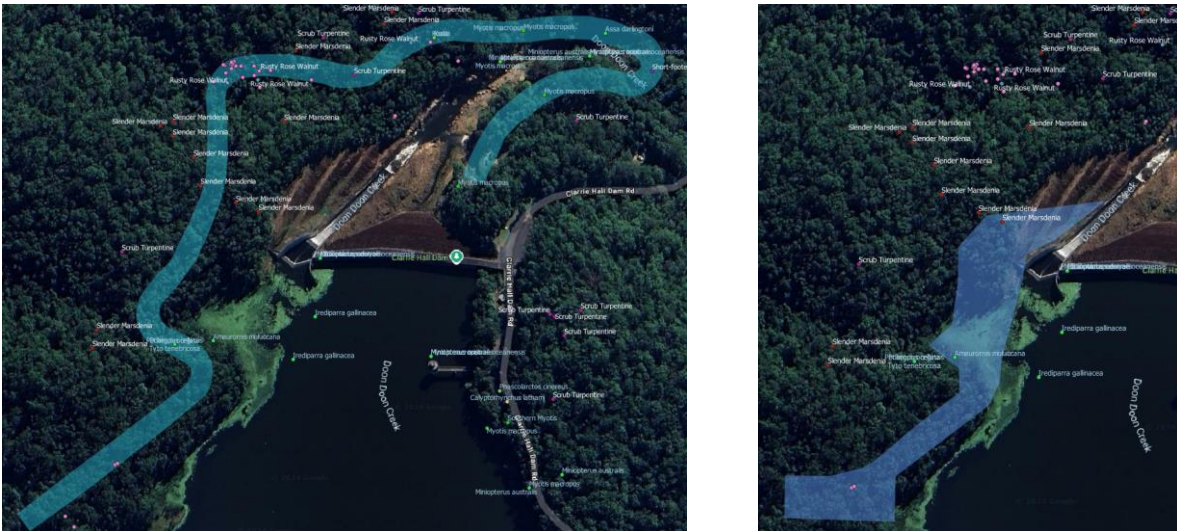


Figure 5: Proposed rock quarry haul road options 1 (left) and 2 (right).

Recommended action:

18. Haul road option 2 be adopted as part of the project design to minimise direct and indirect biodiversity impacts.

Opportunities to further reduce the development footprint around the dam wall construction zone need to be considered

The mapped construction disturbance area around the dam wall appears to extend well beyond the various construction components of the project, particularly if the haul road option 2 is adopted (see Figure 6 below). Biodiversity credit obligations calculated in the BAM-C and presented in the BDAR have been based on a broader construction disturbance area, which indicates there may be opportunities for the proponent to further avoid biodiversity impacts by refining and confirming the actual development/clearing footprint.

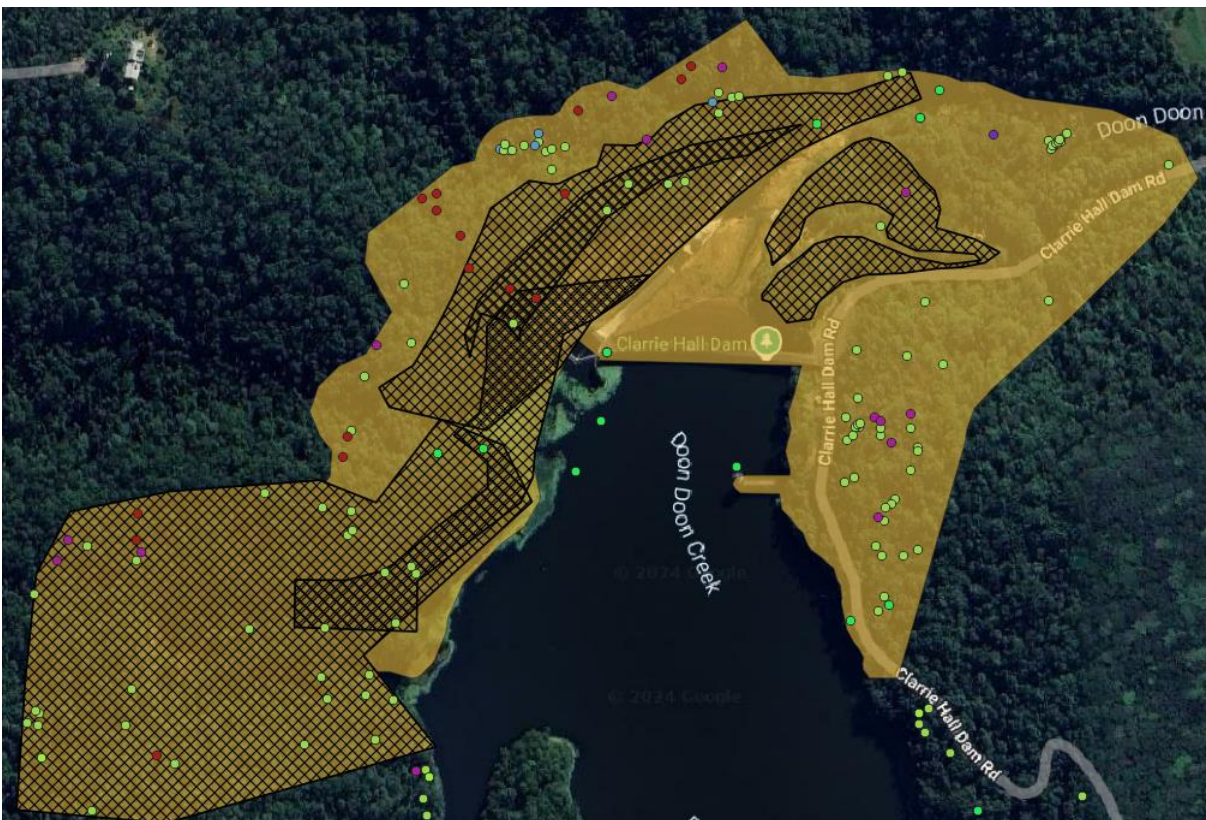


Figure 6: The construction disturbance footprint (orange) extends well beyond the various components of the dam wall construction (cross hatched area). Threatened species records are shown as various coloured dots. Note: the development footprint for the proposed realignment of Clarrie Hall Dam Road has not been provided in the BDAR.

Recommended action:

19. The project development footprint around the rock quarry haul road, new spillway and realigned Clarrie Hall Dam Road be further refined and detailed in the BDAR to avoid biodiversity impacts.

Staging the dam water level increases in response to predicted community water demand will minimise impacts on threatened entities

The project involves filling the dam from its current capacity of 16,000 ML to a FSL of 42,300 ML upon completion, resulting in an extensive area of threatened species habitat being rapidly inundated. The much larger FSL resulting from the project is expected to meet community water demands up to and beyond 2065. Presumably, the community water demand will increase progressively in response to population growth, and so the volume of water held in the upgraded dam at the FSL is unlikely to be required for several decades.

Section 7.2.2 of the BDAR indicates environmental stream flows in Doon Doon Creek downstream of the dam are currently supported by dam releases of 4 ML per day, which suggests the dam operator may have some control over the dam water level. Assuming the dam water level can be monitored and controlled with a reasonable level of precision via dam releases, Council could stage incremental increases in the dam water level in response to increasing community water demand over the next 40 years. This would significantly slow the rate of permanent inundation of threatened species habitat and provide much more time for flora and fauna assemblages to adapt and migrate in response to incremental habitat loss. It would also provide significantly more time for proposed mitigation measures involving seed collection and assisted establishment of threatened flora species beyond the future FSL. Biodiversity credit obligations generated by the project could also be retired over time to align with each incremental increase in the dam water level.

Recommended action:

20. Dam water levels be increased incrementally to cater for gradually increasing water demand rather than immediately filling the upgraded dam to the 42,300 ML FSL, with consideration given to retiring biodiversity credits in a staged way to accord with the impacts of each incremental increase in dam water level.

Potential downstream biodiversity impacts during the dam filling phase need to be further considered

The BDAR does not contain enough detail about potential downstream biodiversity impacts associated with ceasing spillway discharges during the dam filling phase, which is anticipated to take several months to complete. The severity of potential biodiversity impacts of ceasing spillway discharges for up to 12 months would likely vary depending on prevailing weather conditions, with greater impact likely if the dam filling was to occur during an extended dry period. The BDAR does not contain any contingency measures to minimise potential biodiversity impacts of dam filling during an extended dry period.

Recommended action:

21. The BDAR be revised to include detail about the potential biodiversity impacts of dam filling during an extended dry period and proposed contingency measures to minimise such impacts.

Further consideration and management of prescribed impacts is required

Part of the project includes replacing McCabes Bridge. The prescribed impact assessment detailed in Table 7.2 of the BDAR has not considered how threatened microbat species may be using McCabes Bridge as sheltering/breeding habitat, particularly the southern myotis, which the proponent would be required to assess as a potential prescribed impact under section 6.1.2 of the BAM.

Recommended action:

22. The BDAR be revised to assess the prescribed impact on threatened microbat roosting and/or breeding habitat from removing McCabes Bridge and measures to minimise potential impacts.

Measures to minimise road strike need to be considered further

Wildlife either displaced during proposed habitat removal or traversing the site as part of breeding activity, migration or dispersal from natal areas may be more susceptible to road strike during the project construction phase. The Construction Traffic Management Plan (CTMP) has included some mitigation measures relating to hours of operation, vehicle speed limits and training personnel. However, it has not included using temporary fauna exclusion fencing around high traffic areas to minimise potential adverse interactions between wildlife and construction machinery.

Recommended action:

23. The CTMP be revised to include temporary fauna exclusion fencing around high traffic areas during the project construction phase to minimise potential fauna road strike mortalities.

Impacts on habitat tree hollow resources require additional mitigation

The project is expected to remove up to 48 hollow-bearing habitat trees, which provide potential sheltering and/or breeding resources for a variety of threatened hollow-dependent fauna species. The BDAR does not contain any proposed mitigation measures that would provide alternative sheltering resources for hollow-dependent fauna displaced by the project.

Nest boxes can play an important role in providing temporary short-term shelter (e.g. up to 5 years) for hollow-dependent fauna if they are suddenly displaced by development, particularly if there is a shortage of natural hollows in the adjacent retained vegetation. Nest boxes give displaced animals time to adapt their home ranges and territories and mitigate the increased predation risk immediately after being displaced.

Recommended action:

24. The BDAR be revised to include a requirement for a nest box management plan to be prepared to mitigate the impacts of habitat tree removal on hollow-dependent fauna displaced by the project.

Separate biodiversity management plans need to be prepared for the construction and operational phases of the project

Table 7.3 of the BDAR lists several mitigation measures aimed at minimising indirect and prescribed biodiversity impacts of the project. However, some of these measures have either not been incorporated into a specific management plan (e.g. pre-clearing protocols, relocating felled timber, threatened flora seed collection) or they have been included in management plans generally unrelated to biodiversity such as traffic management and water management. Large-scale projects typically bring together all biodiversity-related management and monitoring actions into sub-management plans, which then form part of the over-arching construction environment management plan (CEMP) and operational environmental management plan (OEMP).

Recommended action:

25. Table 7.3 of the BDAR be revised to include flora and fauna sub-management plans prepared in consultation with BCS, which are to be included in the CEMP and OEMP to guide all biodiversity-related mitigation and monitoring measures throughout the construction and operational phases of the project.

A procedure to manage unexpected threatened species detections during construction is required

Although biodiversity surveys completed to inform the BDAR and EIS have been comprehensive, the possibility of detecting threatened species not considered in the EIS and BDAR during the post-approval construction phase of the project remains. The BDAR has not included a procedure to manage impacts on threatened entities discovered during construction, as is typical in construction projects of this scale.

Recommended action

26. The CEMP for the project to include an unexpected finds procedure to ensure any threatened entities not considered in the EIS and BDAR recorded on the subject land post-approval are appropriately assessed and managed to avoid, minimise and/or offset potential impacts.

More measures are required to mitigate potential impacts to adjacent vegetation

The mitigation and management measures provided in Table 7.3 of the BDAR do not include requirements to:

- rehabilitate areas disturbed during construction which are not required for operational purposes (e.g. rock quarry, access road batters and cuttings)
- clearly delineate vegetation clearing limits before commencing clearing works.

These mitigation measures are necessary to help protect areas of retained native vegetation from long-term edge effects and accidental over-clearing during construction.

Recommended action:

27. Table 7.3 of the BDAR be revised to include requirements to:

- a. rehabilitate areas disturbed during construction which are not required for operational purposes (e.g. rock quarry, access road batters and cuttings)
- b. clearly delineate vegetation clearing limits before commencing clearing works.

Additional biodiversity credits are required for residual indirect impacts

Vegetation clearing to construct the upgraded dam wall will create several thousand metres of new forest edge, which will result in residual long-term indirect impacts on vegetation condition and habitat quality within retained forest areas along the new forest edge.

In line with Section 8.6 of the BAM, proponents should provide additional biodiversity credits to compensate for residual indirect impacts of a proposal on areas of native vegetation, threatened ecological communities (TECs) and/or threatened species, or their habitats, adjacent to the subject land.

Section 4.5.10 of the BAM 2020 Operational Manual – Stage 2 (DPE 2023) also provides further guidance on approaches for calculating an offset for residual indirect impacts.

Recommended action:

28. The BDAR be revised to include additional biodiversity credits to compensate for residual indirect impacts from vegetation clearing during the project construction phase.

Flooding

The EIS addresses the Secretary's requirements for flooding and the project design and proposed works are consistent with the policy and objectives of the Flood Risk Management Manual 2023.