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25 September 2025

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Our Ref.: 022/25

Review of the Ecological Reports supporting the Resource Consent Application by Winstone Aggregates for the Whitehall Quarry Expansion at 249 & 253 Whitehall Road, Te Miro - LU/0160/25

Dear Waipa Planning Team,

1. Background Information

This letter provides a review of three ecological reports submitted to Waipa District Council in support of Winstone Aggregates' resource consent application for the long-term expansion of Whitehall Quarry (application number LU/0160/25).

The reports were prepared by several authors from Boffa Miskell between May and July 2025 and reviewed internally by Ian Boothroyd. The documents reviewed are:

1. Boffa Miskell Limited 2025. *Whitehall Quarry Long-Term Expansion: Assessment of Terrestrial Ecological Effects*. Report prepared by Boffa Miskell Limited for Winstone Aggregates – Appendix 9 of the consent application,
2. Boffa Miskell Limited 2025. *Whitehall Quarry Long-Term Expansion Planting Plan*. Report prepared by Boffa Miskell Limited for Winstone Aggregates – Appendix 15 of the consent application, and
3. Boffa Miskell Limited 2025. *Pest Management Operations Plan: Whitehall Quarry Expansion*. Report prepared by Boffa Miskell Limited for Winstone Aggregates – Appendix 16 of the consent application.

The purpose of this peer review is to assess whether the potential loss of mature forest and associated ecological values from the proposed quarry expansion has been adequately addressed in the ecological effects assessment report and management plans. In particular, the review considers the adequacy of the proposed mitigation, offset, and compensation measures, including staged clearance, fauna management protocols, enhancement planting, and animal pest and weed control.

This review focuses on the ecological robustness and practicality of the proposed measures, with an emphasis on long-tailed bat conservation and the effectiveness of the planting and pest management programmes in restoring and maintaining ecological values within the compensation areas.

Peer Review Comments for Report 1 - Whitehall Quarry Long-Term Expansion: Assessment of Terrestrial Ecological Effects (AEE)

Executive Summary

Report:

The **Executive Summary** describes that Winstone Aggregates are seeking consent to expand the authorised extraction area of Whitehall Quarry by approximately 15.5 ha, which will involve the clearance of 5.46 ha of mature broadleaf forest within Significant Natural Areas (SNAs; WP527 and WP530) and 0.22 ha of lower value kanuka scrub within 10 m of a 'natural inland wetland'. The SNAs are recognised for their high ecological value, particularly as habitat for long-tailed bats and birds. The ecological assessment identifies the values of the vegetation to be removed, evaluates potential effects, and outlines proposed management measures consistent with the effects management hierarchy under the NPS-IB and Waipa District Plan. The proposal includes staging of vegetation clearance, fauna management protocols, animal pest and weed control in the remaining SNA areas, and the establishment of 12.5 ha of enhancement planting to offset and compensate for the vegetation loss. Subject to these measures, the assessment concludes that the overall ecological effects will be less than minor and that the expansion can achieve no net loss and an overall net gain in indigenous biodiversity in the long-term.

Comment:

The executive summary provides a good overview of the contents of this report. I note that, to avoid confusion when reading Section 4.1 (page 14), it could be stated here that overall a total area of 1.9 ha of kanuka scrub will be removed as part of the proposal, but that only 0.22 ha are within 10 m of a natural inland wetland and have been accounted for in the offset calculations, while the remainder of the kanuka scrub clearance is a permitted activity that will not be mitigated for.

A vegetation map would have been useful to clearly depict the various vegetation types described in the report. The map provided in Appendix 7 titled 'Whitehall Quarry vegetation map' that is referred to later in the report, does not show vegetation types, but only provides an overview of the location of RECCE plot sites. This map appears to be same map inserted as Appendix 4 and may have erroneously

been repeated in Appendix 7 instead of an actual map showing the assessed vegetation types. The map shown as Figure 11 (page 37) shows the affected SNA areas and the 10 m-wide setbacks around the natural inland wetlands but does not depict the vegetation types described in Section 6.1.

Section 1 - Introduction

Report:

Section 1 of the report provides a comprehensive overview of the project, including the general location, ownership details, and the history of the quarry. It is explained that the proposed expansion of Whitehall Quarry by 15.5 ha is intended to meet long-term demand for aggregate supply, extending quarry operations for approximately 35 years. While the quarry's operational activities will remain unchanged, the expansion will extend beyond the Significant Mineral Extraction Zone and into Rural zoned land and require the removal of 5.46 ha of indigenous vegetation within Significant Natural Areas. The ecological assessment will evaluate the existing ecological values, potential impacts, and recommended measures to avoid, remedy, mitigate, or offset adverse effects, with a focus on applying the effects management hierarchy. The provided Figure 1 depicts the extent of the existing consented quarry area, the proposed long term expansion footprint, the significant mineral extraction zone and the relevant Waipa District Plan overlays, including nearby SNAs, areas designated as Visually Sensitive Hill Country and known archaeological sites.

Peer Review Comment:

This section provides a good overview of the proposal and the approach taken to assess its impact. It is noted in Section 1.3 that a separate report has been prepared to assess the affected natural inland wetlands and streams. This report has not been sighted and is not part of this review.

Section 2 – Ecological Context

Report:

Section 2 of the report describes that Whitehall Quarry is located in the Maungatautari Ecological District (ED), a landscape that has undergone extensive deforestation, with less than 10% of its original indigenous vegetation remaining. The quarry sits within a wider ecological setting that includes nearby small to medium-sized SNAs, as well as the larger Te Tapui Reserve to the north, and Mt. Maungatautari to the south, all within the Indigenous Forest Corridor designation identified in the Waipa District Plan for biodiversity enhancement. Several SNAs occur on or near the quarry site, including mature podocarp–broadleaved forest remnants of local significance. The area also supports threatened fauna species such as long-tailed bats and provides important ecological connectivity between larger forested areas and reserves. Maintaining and enhancing connectivity is noted as a key opportunity within the effects management framework for the proposed quarry expansion.

Peer Review Comment:

The ecological context is described comprehensively, with clear reference to the historical and current state of vegetation cover, the significance of surrounding SNAs, and the importance of connectivity within the wider landscape. This provides an appropriate foundation for assessing the potential effects of the quarry expansion.

Some minor errors were noted in this section, e.g., the Te Tapui Reserve is not located 7 km to the west of the quarry as stated but indeed 7 km to the north-east. The report also quotes from the wrong section of the Waipa SNA report (Deichmann & Kessels, 2013) in Section 2.4 and states information for the Waipa ED instead of the relevant Maungatautari ED. The correct section of the Waipa SNA report emphasises the importance of the Maungatautari ED and the Maungatautari Ecological Island, in particular, for the biodiversity values of the wider Waipa District and lists a range of threatened fauna species present on the mountain and in the wider area, including numerous records of long-tailed bats. However, these errors do not affect the remainder of the findings of the report.

It could be pointed out more clearly in this section that the affected SNA WP527 at the northern margin of the quarry is contiguous with the QEII covenanted SNA WP527a, which is of regional significance (as correctly shown in Table 1 in Section 2.3).

Section 3 – Definitions and Statutory Assessment Criteria

Report:

Section 3 outlines the statutory and policy framework relevant to assessing ecological effects of the Whitehall Quarry expansion. Key instruments include the National Policy Statement for Indigenous Biodiversity (NPS-IB), the Waikato Regional Policy Statement (RPS), and the Waipa District Plan (WDP). The NPS-IB requires no net loss of biodiversity, directs the use of the effects management hierarchy, and provides specific provisions where aggregate extraction may justify vegetation clearance (Section 3.2.1, page 10). The WDP reinforces the protection of indigenous biodiversity through objectives and policies for SNAs and biodiversity corridors, while also recognising the role of Significant Mineral Extraction Zones in enabling quarrying subject to mitigation and offsets. Existing consent conditions require rehabilitation and replacement planting, and the effects management hierarchy is confirmed as the guiding framework for addressing residual impacts.

Peer Review Comment:

The section provides a thorough summary of the relevant statutory context and assessment criteria, with clear reference to the NPS-IB, RPS, and WDP requirements. The explicit integration of the effects management hierarchy establishes a sound basis for evaluating ecological effects and proposed mitigation. For clarity, it could be helpful to more directly identify where potential tensions may arise between quarry expansion provisions in the Significant Mineral Extraction Zone (SMEZ) and biodiversity protection objectives in the WDP, as this will likely be a key point of scrutiny in consent decision-making.

Section 4 – Proposed Activities

Report:

Section 4 of the report details the proposed activities, i.e., the proposed quarry expansion involves extending the extraction pit 15.5 ha westward, partly beyond the SMEZ and into Rural zoned land. This will require the removal of 5.46 ha of indigenous vegetation within two SNAs and 1.9 ha of kanuka scrub. The works are planned in two stages: Stage 1 (2025–2026) will focus on clearance and stripping in the north-western area (WP527), including 2.6 ha of SNA WP527. Stage 2, anticipated to commence around 2041, will extend the pit to the south-west and involve clearance of 2.86 ha within SNA WP530.

Peer Review Comment

The description of proposed activities is clear, with the staging and spatial extent of the vegetation removal well described. As previously mentioned, a map that clearly depicts the various effected vegetation types described in the report would have been useful.

The phased approach provides transparency around the timing of impacts, which allows for planning of mitigation and monitoring over the long term. It would be helpful, however, to highlight whether staging also creates opportunities for adaptive management, for example, reviewing ecological outcomes from Stage 1 before committing to vegetation removal in Stage 2.

Section 5 – Methods

Report:

Section 5 outlines the methods used for the assessment of ecological values in the quarry expansion area. The assessment involved multiple surveys between 2021 and 2024. Vegetation communities were mapped in ArcGIS and described using standard protocols, supported by 10 RECCE plots within the two tawa forest SNAs (WP527 and WP530). A full species list of native and exotic plants was compiled, with DBH measured for woody plants >5 cm.

Fauna surveys included:

- Herpetofauna: Two intensive lizard surveys (2021 and 2024) using artificial cover objects and pitfall traps, supplemented by incidental observations and habitat assessments.
- Avifauna: Five-minute bird counts undertaken in the northern tawa remnant in January 2024, supported by incidental records and New Zealand Bird Atlas data.
- Bats: Acoustic monitoring in 2021 and 2024 using DOC automatic bat monitors, with effort targeted at habitat features likely to be used by long-tailed bats. Roost tree surveys, habitat assessments, and landscape connectivity assessments were also undertaken.

Peer Review Comment

The survey programme represents a comprehensive multi-taxa approach, combining vegetation plots, targeted fauna surveys, and habitat/landscape assessments. The methods generally align with accepted

ecological survey standards and provide sufficient detail to evaluate the ecological values potentially affected by the quarry expansion, as well as to assess potential impacts.

That said, I would have liked to see at least one RECCE plot undertaken within the kanuka scrub to clarify its ecological value, and I note that the map in Appendix 4 does not summarise vegetation plot assessments as stated; it only shows plot locations.

The report correctly acknowledges the detection limitations of lizard and bat surveys, emphasising that absence of records does not confirm absence. However, the map in Appendix 5 shows survey effort for lizards was focussed on the tawa forests, while copper skinks (*Oligosoma aeneum*; At Risk – Declining) have previously been reported at Whitehall Quarry in an area described as “*largely exotic grass which is intensively managed*” (Ecology New Zealand, 2022 Lizard Management Plan provided as part of Appendix 14 of the consent application). This raises questions about whether pasture areas within the proposed expansion footprint were surveyed with sufficient intensity. Appendix 9 of the AEE also presents some inconsistency: it states that pasture areas are of limited value for native lizards, yet the following table recognises that long exotic grasses may provide habitat for copper skinks and striped skinks (assessing them as Negligible–Low). Ecology New Zealand (2022) likewise notes that pasture grass is “*only expected to support copper skinks*.” Given that copper skinks were recently reclassified from Not Threatened to At Risk – Declining (Hitchmough *et al.*, 2021)¹, their protection on site should be prioritised.

A minor point: Section 5.2.3.1 cites O'Donnell *et al.* (2018). This has since been updated, and the appropriate reference should be O'Donnell *et al.* (2023), though the threat status of long-tailed bats remains unchanged.

Section 6 – Survey findings

Report:

Section 6 of the report describes that the proposed quarry expansion area contains a mosaic of terrestrial habitats, including two areas of mature tawa forest (SNAs WP527 and WP530), kanuka scrub, a gorse patch, and pasture. The tawa forests support diverse canopy species such as tawa, pukatea, mangeao, rimu, miro, and rewarewa, with epiphytes and lianas also present. However, the understorey is generally sparse due to browsing pressure from deer and potentially goats, with only limited regeneration of canopy tree seedlings. Exotic species were uncommon, limited to scattered inkweed and pampas.

The kanuka scrub is described as dominated by kanuka with an incomplete canopy and limited native understorey, with exotic grasses and weeds forming the groundcover.

¹ Hitchmough, R.A.; Barr, B.; Knox, C.; Lettink, M.; Monks, J.M.; Patterson, G.B.; Reardon, J.T.; van Winkel, D.; Rolfe, J.; Michel, P. 2021: Conservation status of New Zealand reptiles, 2021. New Zealand Threat Classification Series 35. Department of Conservation, Wellington. 15 p.

The gorse patch and pasture habitats are of limited species diversity.

Faunal surveys indicate low lizard abundance, with repeated survey and salvage operations detecting no lizards. Bird surveys recorded 14 species, mostly common natives and exotics, with the nationally threatened New Zealand falcon also present and potential occasional use by North Island kaka, North Island robin, and yellow-crowned parakeet. Acoustic surveys in 2021 and 2024 recorded very high levels of long-tailed bat activity across the site, particularly in the western SNA, with consistent patterns of emergence, foraging, and roosting behaviour. Both SNAs provide numerous suitable roost trees, and the forests are assessed as being of high roosting suitability and therefore “*of high importance to bats*”.

Peer Review Comment

The survey results provide a thorough and balanced description of the ecological values present and are supported by several photographs. The vegetation descriptions clearly document the composition, condition, and regeneration potential of the forest and scrub communities, with browsing impacts in the tawa forests appropriately highlighted as a constraint on recovery. Notably, podocarp species (rimu and miro) are reported in the canopy, albeit at low densities, and weed presence was very low, both suggesting high-quality forest habitat. Although the report refers to “*very large mature trees*” and “*old growth native trees*”, the inclusion of average canopy height and DBH measurements of the tallest specimens would have provided a clearer picture of the forest structure.

It was noticeable that the description of the kanuka scrub mentions a canopy height of 3–4 m, however, the kanuka shown in the photographs of Figure 6 (page 26) appear taller than 4 m. As previously noted, the map in Appendix 7 shows only RECCE plot locations and does not illustrate the distribution of vegetation types; a true vegetation map would have strengthened the presentation. It is also noted that an outdated version of de Lange *et al.* (2018) has been used for threat rankings of plant species. This should be corrected to reflect the most recent classification (de Lange *et al.*, 2023), under which neither climbing rata species nor kanuka are listed as Threatened. The report acknowledges this later in Section 7.1 (page 33).

The faunal surveys are consistent with best practice, with repeated lizard searches and salvage operations. However, while the dual survey seasons strengthen confidence in the results, a “*lack of lizards*” in the quarry expansion area can therefore not be safely assumed. While I agree with the statement made that the presence of various predators on site will have an impact on lizard populations, I disagree with the conclusion that there is a “*lack of lizards*” in the subject area and note that the pasture areas have not been surveyed for lizards, despite the fact that copper skinks were found in similar habitat in the southern quarry expansion area (Ecology New Zealand Limited 2022 Lizard Management Plan).

Bird surveys identified the expected mix of species for the habitat types present, with appropriate consideration of potential transient use by Threatened species recorded in the wider landscape. I agree with the assumptions made about the absence of certain species (e.g., long-tailed cuckoo or fembird).

However, I note that sightings of North Island kokako have now been reported from forest remnants outside Maungatautari Ecological Island, including a site just over 2 km southwest of the quarry where bush falcons and North Island kaka are also recorded. While the report notes that kaka are most often associated with large bush remnants, they are also frequently observed in small forest patches or even in isolated trees within open country. I therefore agree with the statement that kaka “*may potentially make use of the tawa forests*” and consider their presence in the remnants to be highly likely. The falcons recorded on site are also most likely to be bush falcon (*Falco novaeseelandiae ferox*), which are currently ranked as Threatened – Nationally Increasing (Robertson *et al.*, 2021). The report refers only to *Falco novaeseelandiae* with a threat status of Nationally Vulnerable, which may instead reflect the eastern falcon (*F. novaeseelandiae novaeseelandiae*). This distinction should be clarified.

The bat survey findings are particularly significant. Very high levels of long-tailed bat activity were recorded across the site, especially within the western tawa remnant, with the timing of bat passes and habitat assessments strongly indicating the presence of multiple roost trees. The survey effort is robust, and the conclusion that the indigenous forests within the expansion area are of high ecological value for bats at both local and regional scales is well supported.

Section 7 – Ecological values

Report:

The ecological values assessment in **Section 7** identifies the mature tawa forests (SNAs WP527 and WP530) as the key habitat features of Very High value, due to their rarity in the modified landscape and importance for long-tailed bats. Other vegetation types, including kanuka scrub, gorse, and pasture, are assessed as Low value. Although a variety of micro-habitats is present on site, lizard habitat was assessed as Low–Moderate overall due to likely very low densities present as a result of high predation pressure. Avifauna habitat is assessed as Moderate, with potential but limited use by At Risk or Threatened species given alternative habitats nearby. Bat habitat is assessed as Very High, reflecting high levels of activity and roosting opportunities in the tawa forests.

Peer Review Comment

The ecological values section provides a clear and structured assessment of the main habitat types and fauna groups present within the expansion area.

As mentioned in my review of Section 6, it is noted that reference has been made to *Department of Conservation (2023)* threat classification lists for vascular plants in the second paragraph of Section 7.1. This should be updated to *de Lange et al. (2023)*.

The emphasis on the tawa forests as the primary ecological feature of significance is well justified, given their rarity in the wider modified landscape, their recognition as SNAs, and their confirmed use by long-tailed bats. The use of the standard ecological value assessment framework, with supporting tables, is appropriate and transparent. However, I would not assess the kanuka scrub together with the exotic vegetation as shown in Table 4. Kanuka scrub is representative of young secondary forest types in the

area and an early step in the succession to more advanced podocarp-broadleaved forest. In addition, given the confirmed presence of long-tailed bats on site and their known use of kanuka for roosting, I consider the ecological value of this habitat to be understated. In my view, the kanuka scrub warrants at least a Low-Moderate overall ecological value, with Moderate ratings for both 'Representativeness' and 'Ecological Context'.

The fauna assessments are consistent with the survey effort undertaken. The lizard assessment appropriately recognises the low probability of resident populations given predation pressure and lack of detections. The avifauna assessment is balanced in noting potential use of the site by At Risk or Threatened species but also acknowledging the availability of larger and higher-quality habitats in the wider landscape. I would also reiterate the presence of falcons on site in this section. However, this omission does not change the overall assessment of the value of the tawa forests. The bat assessment is particularly robust, with the strong survey evidence confirming the Very High ecological value of the tawa forests and associated roosting opportunities.

Section 8 – Assessment of ecological effects

Report:

Section 8.1 explains that the assessment approach considers the ecological effects of the proposal in three steps:

1. Effects expected **without any management** in place (assessed in Sections 8.2 to 8.5).
2. Effects expected **with mitigation measures** (but excluding offsets; assessed in Section 9).
3. Effects expected **with both mitigation and offsets** applied (assessed in Section 10).

This structured approach allows a clear comparison of how proposed management measures reduce potential adverse ecological effects.

Sections 8.2 to 8.5 identifies again that the quarry expansion will require clearance of 5.68 ha of indigenous vegetation, including 5.46 ha of mature tawa forest within SNAs, and 0.22 ha of kanuka scrub. Loss of the tawa forests is assessed as a Moderate effect due to their Very High ecological value, although only a small proportion of each SNA will be removed. Effects on lizards are expected to be Moderate given their likely low densities and availability of nearby habitat, though quarrying activities may pose risks of disturbance. Avifauna effects are assessed as Moderate overall in Table 6, as mobile bird species are expected to adapt or disperse, though risk to cavity-nesting species remains if clearance occurs during breeding (which is not proposed). Effects on bats are assessed as Moderate-High, recognising the risk of injury or mortality caused by vegetation clearance and the very high ecological value of bat habitat and the likelihood of roosts being removed, though most forest cover and edge habitat will remain. The cumulative effects assessment in Section 8.5 points out that the vegetation proposed to be cleared in the expansion area is only a small proportion of the overall vegetation present in the wider landscape and that other significant habitat and most of the affected SNAs will remain intact.

Peer Review Comment:

The effects assessment is generally well structured and benefits from the stepwise approach that differentiates between impacts before and after management. This provides useful clarity on how mitigation and offsetting measures are intended to reduce adverse effects.

However, in my view, the assessment appears to understate potential risks to bats. Given the confirmed Very High ecological value of the tawa forests, the consistent high levels of bat activity across the site, and the likelihood of roost tree loss, the residual risk to local bat populations remains significant. While staged clearance and retention of large portions of each SNA are positive, the removal of mature roost trees that are likely relicts of the original primary forest cover cannot be readily mitigated in the short or medium term, and this limitation deserves stronger emphasis.

The treatment of kanuka clearance as a permitted activity under the Waipa District Plan is correct in regulatory terms, yet the report could better acknowledge the role of kanuka scrub in providing habitat and maintaining connectivity within the landscape. Its ecological value should not be dismissed solely on the basis of plan rules.

Regarding avifauna, the assessment may downplay potential effects. While I agree with the conclusion that quarry noise and the mobility of most bird species reduce the likelihood of direct mortality, I do not agree with the statement that the effects on local avifauna are *“expected to be minimal.”* Many threatened species in New Zealand are primarily declining due to habitat loss. The displacement of local birds (and bats) through vegetation clearance and ongoing disturbance should be recognised as at least a Moderate effect, even if regional-scale populations are unlikely to be impacted.

The cumulative effects assessment (Section 8.5) is very brief and largely descriptive. It does not adequately account for the history of vegetation clearance at Whitehall Quarry or the wider locality, nor does it consider how incremental losses of indigenous forest remnants and bat habitat accumulate over time. While it is correct that 88% of the affected SNAs will remain, the ecological implications of repeated small-scale clearances of mature tawa forest - a rare and regionally important habitat - are not explored. A more robust cumulative effects assessment should explicitly address:

- Previous and ongoing vegetation losses within the quarry property.
- The contribution of this proposal to overall habitat loss in the district.
- The long-term implications for connectivity, ecological function, and bat populations.

Section 9 – Effects management with no offset

Report:

Section 9 acknowledges that the quarry expansion will remove high-value indigenous vegetation and habitat, including potential bat roost and bird nesting sites. However, it argues that the loss is a relatively small proportion of the available habitat, with most SNAs remaining intact and connected.

The proposed management measures (without offsetting) include:

- Avoidance of vegetation clearance during sensitive breeding periods for birds and bats.
- Implementation of pest suppression programmes to enhance surrounding habitats.
- Strict tree felling protocols to minimise mortality of bats, cavity-nesting birds, and lizards.
- Salvage and relocation procedures for herpetofauna.
- Pre-clearance nest checks and exclusion zones for native birds.
- Ongoing monitoring and pest management through the Quarry Management Plan and Bat Management Plan.

On this basis, the authors conclude that residual effects (without offsetting) are no more than minor for vegetation, herpetofauna, avifauna, and bats.

Peer Review Comment:

The section sets out a wide range of management measures and demonstrates alignment with the effects management hierarchy (avoid, minimise, remedy). However, the assessment is heavily weighted toward procedural mitigation (e.g., timing restrictions, protocols, pest control). Although, I fully agree with these proposed procedures, I find that the section does not fully address the residual loss of very high-value tawa forest and bat roosting habitat. The conclusion that effects are “no more than minor” seems overstated, given that permanent clearance of irreplaceable old-growth forest cannot realistically be “remedied” by pest management in remaining SNAs (noting that this section assesses the effects before offsetting, i.e., planting of 12.5 ha of mitigation area).

A stronger assessment would:

- Explicitly recognise the limits of management measures to address the permanent loss of mature forest.
- Differentiate more clearly between temporary, avoidable effects (e.g., disturbance during breeding) and irreversible effects (habitat clearance).
- Reassess whether “no more than minor” is an appropriate conclusion in the absence of offsets, especially for long-tailed bats, where cumulative roost loss is a critical concern.

Section 10 – Effects management with offset

Report:

Because the quarry expansion unavoidably removes 5.68 ha of high-value indigenous vegetation (mainly tawa forest, plus a small area of kanuka scrub), **Section 10** of the report recommends an offset through 12.5 ha of enhancement planting on nearby pasture. Using the Biodiversity Offset Accounting Model (BOAM), the authors determine that a 2:1 replacement ratio will achieve a net biodiversity gain.

The enhancement area is located outside the quarry SMEZ and will be managed for pest plants and animals, deer/goat exclusion, and stock removal. Planting will focus on eco-sourced native pioneer species with later enrichment planting to create tawa-dominated forest.

Benchmarks (e.g., canopy cover, species diversity, understorey cover) were derived from Maungatautari Mountain as a reference ecosystem. Timeframes vary: canopy cover and weed suppression may be achieved within 5 years, while tawa maturity and understorey development will take ~20 years. Discount rates were applied to account for lag time, with a reduced discount for the western tawa forest since offset planting will occur before clearance.

The offset is expected to deliver a net gain for terrestrial vegetation, lizard, bird, and bat habitats through both direct planting and improved connectivity of the Waipa District biodiversity corridor. A detailed Planting Plan and Pest Management Plan are provided as Appendix 15 and Appendix 16 of the consent application. The section concludes that, with offsetting, ecological effects are less than minor.

Peer Review Comment:

The offset proposal is generally thorough and demonstrates alignment with the effects management hierarchy. The use of BOAM provides transparency in quantifying biodiversity losses and gains. However, I note that the use of 80% canopy cover and 10 m tawa height as benchmarks appears to reflect early to mid-stage restoration targets rather than the structure of mature reference forest (e.g., the forest on Mt. Maungatautari, which typically exhibits >95% canopy cover and tawa heights exceeding 20 m). While these values may be appropriate as functional milestones (e.g., weed suppression, tawa fruiting for birds), they underestimate the structural maturity and habitat values lost through clearance of old-growth forest, particularly for species dependent on large trees and cavity formation such as bats or kaka. Therefore, I recommend that the BOAM modelling be re-run using stricter benchmarks (e.g., 95% canopy cover, 20 m tawa height) to test the sensitivity of the results. This would provide greater transparency on whether the proposed offset still delivers no net loss under more ecologically realistic reference conditions. At a minimum, the report should clearly distinguish between functional and structural equivalence in describing offset outcomes.

- Timeframes and lag: While a 20-year timeframe is acknowledged for tawa maturity, ecosystem services provided by old-growth forests (e.g., bat roosting, cavity-dependent fauna) may take far longer to replace. The current offset proposal should be framed as partial ecological equivalence rather than full replacement.
- Pest management risks: Achievement of biodiversity outcomes is contingent on intensive, long-term pest control and fencing. Explicit commitments (e.g., minimum 35-year management period, monitoring triggers) should be clearly tied to enforceable consent conditions. I also note that many of the trees to be removed are far older than 35 years and would question if a 35-year management period is sufficient as a mitigation for the habitat loss caused. The permanent legal protection of the remaining SNAs and the planting area would be recommended.

- Cumulative effects: The assessment would be more robust if it situated the offset within a wider landscape context, acknowledging prior vegetation loss at Whitehall Quarry and how this offset interacts with past or future consents.

Overall, the offset design is credible and positive, but the certainty of achieving “no net loss” should be tempered with recognition of ecological lag times, and management dependencies.

Section 11 – Pest Management Plan

Report:

Section 11 explains that a Pest Management Plan is a central part of the ecological effects management for the quarry expansion. It aims to strengthen protection for indigenous vegetation and fauna by reducing pest pressures and contributing to broader regional biodiversity goals.

Key elements include:

- Baseline monitoring of pest species in key SNAs (WP527, WP530, WP532) before any works.
- Pulsed pest suppression prior to bird and bat breeding seasons, followed by continuous control and monitoring.
- Pest management buffer zones around SNAs and enhancement planting areas.
- Ungulate-proof fencing around SNAs and planting areas.
- Use of new pest control technologies where effective.
- Ongoing monitoring and adaptive management to ensure effectiveness.

The Pest Management Plan will provide detailed operational guidance, including mapping, methodologies, best practice protocols, equipment, schedules, signage, reporting, and review processes.

Peer Review Comment:

I agree with the statements made in this section and will provide a review of the submitted Pest Management Plan below.

Section 12 – Assessment against the NPS-IB

Report:

Section 12 is clearly structured around the NPS-IB’s objective of maintaining indigenous biodiversity and presents a table (Table 11) that systematically addresses the key components: population size, occupancy, ecosystem function, range and extent, connectivity, and resilience and adaptability. The table links directly to the management measures set out in Section 10 (offset planting, pest and weed control, fauna management), showing an attempt to demonstrate how these measures align with NPS-IB requirements. The assessment concludes that in all cases indigenous biodiversity (IB) will not only be maintained but also enhanced over time.

Peer Review Comment:

While the proposed offset planting, pest management, and fauna management measures are expected to contribute to maintaining indigenous biodiversity values over time, the permanent loss of mature indigenous forest within SNAs represents a significant impact that cannot be immediately replaced. Restoration planting and pest management can provide important long-term biodiversity gains, but these outcomes are subject to time lags, ecological uncertainties, and ongoing management commitments.

Accordingly, although indigenous biodiversity has the potential to be enhanced in the longer term, the permanent loss of 5.46 ha of mature indigenous forest within SNAs cannot be fully replicated by restoration plantings within several decades, and certainty of achieving “no overall loss” in the short-to-medium term is limited. Demonstrating compliance with the NPS-IB therefore requires clear, measurable indicators (e.g., pest density thresholds, canopy cover targets, survival and growth rates of planted species, and monitoring of key fauna such as bats and lizards) and a commitment to independent monitoring and adaptive management.

Section 13 – Assessment against the WDC Plan criteria

Report:

Section 13 assesses the proposed quarry expansion against the Waipa District Plan (Policy S21.14A.6) criteria for vegetation clearance within an SNA. The applicant argues that:

- Adverse effects will be minimised through staging, seasonal avoidance (bat and bird breeding), pest suppression, and rehabilitation.
- Offsetting will occur through 12.5 ha of indigenous forest enhancement planting, fenced and legally protected, at a 2:1 ratio relative to the clearance footprint.
- Lizard salvage protocols will prevent mortality.
- Planting will enhance ecological connectivity between SNAs and strengthen the WDC biodiversity corridor.
- Ongoing pest and weed control will improve long-term ecosystem viability.
- The proposed measures meet the “no net loss” principle, with outcomes described as positive for indigenous biodiversity, water quality, and communities.

Peer Review Comment:

The assessment in Table 12 provides a structured response to the WDC plan criteria and demonstrates how proposed mitigation and offsetting measures are intended to address each requirement. However, the outcomes presented are optimistic in some cases and read as assurances of “no loss” or “no mortality,” which are not guaranteed in practice. For example, while animal pest management and seasonal timing of clearance will reduce the risk to birds and bats, they cannot eliminate it entirely. Similarly, the assumption of “no net loss of indigenous forest” from enhancement planting overlooks

the substantial time lag before restored habitats approach the structure and function of the mature tawa forests being lost.

The treatment of bat habitat also appears understated. Although enhancement planting and pest management may improve conditions in the long term, the immediate loss of high-value roosting habitat cannot be fully offset in the short to medium term. This should be more clearly reflected in the outcomes column.

Finally, the assessment of cumulative impacts and corridor connectivity is somewhat simplistic. While connectivity may eventually be enhanced through restoration, the immediate effect is fragmentation through clearance of forest that currently contributes to the biodiversity corridor. This temporal mismatch is not discussed.

Overall, the table usefully links proposed measures to plan criteria, but the outcomes should be reframed to more accurately acknowledge residual risks, time lags in habitat replacement, and the limitations of management in fully addressing significant ecological values.

A minor comment is that the first paragraph of this section refers to Section 4.5 of the report. I believe this should read Section .3.4.

Section 14 – Conclusion

Report:

The conclusion reiterates that the quarry expansion will remove 5.68 ha of indigenous vegetation, including 5.46 ha of mature tawa forest within SNAs, but proposes 12.5 ha of enhancement planting and pest management as offsets. The report highlights the very high ecological value of the site due to long-tailed bats and mature tawa forest, but concludes that, with the proposed management and offsetting, adverse effects can be avoided, no fauna fatalities will occur, and a net positive biodiversity outcome will be achieved. It states that the proposal is consistent with the NPS-IB, RPS, and WDP, and overall ecological effects will be *“less than minor.”*

Peer Review Comment:

The assessment applies the effects management hierarchy and makes appropriate use of BOAM to design an offset package for the clearance of 5.46 ha of mature tawa forest and 0.22 ha of kanuka scrub. While the package demonstrates a strong commitment to mitigation and offsetting, several aspects require clarification and revision before the conclusion of “no net loss” can be considered robust.

The proposed 12.5 ha of planting represents only a modest ~2.3:1 ratio relative to the forest clearance, which is below the range typically expected for mature indigenous forest (often ~4–9:1 under BOAM). The offset package becomes more defensible when the proposed deer fencing and pest management of 29.96–44 ha of existing tawa remnants are included (refer to the review of the Pest Management Operations Plan, starting on page 21), as this increases the effective ratio to ~5.5–9.7:1, more consistent

with precedent. However, these gains are contingent on a quantified and long-term animal pest control programme with explicit performance targets and monitoring requirements. Without such measures, the majority of the offset benefit is lost.

Several modelling assumptions also appear optimistic. The 80% canopy cover benchmark is low compared to the mature reference forest on Mt. Maungatautari, and the 10 m benchmark for tawa height underestimates the maturity gap, as mature tawa commonly exceed 20 m. These settings may inflate modelled offset gains. Benchmarks should therefore be recalibrated against realistic mature forest conditions or tested through sensitivity analysis.

The treatment of kanuka scrub is inconsistent. Although ~1.9 ha is proposed for clearance, only 0.22 ha (within 10 m of wetlands) has been included in the offset model. While removal of kanuka is a permitted activity under the Waipa District Plan, excluding the balance understates cumulative habitat loss. Given that long-tailed bats are known to roost in kanuka, this vegetation should be assigned at least Low–Moderate ecological value and factored into the offset assessment.

Time delays in offset delivery introduce further uncertainty. Although some planting is proposed ahead of clearance of the western SNA, it will take decades for planted forest to provide equivalent biodiversity values to mature bat roost trees. The reduced 1% discount rate assumes an immediate and sustained programme of planting and pest management; any delay would invalidate this assumption. Precautionary multipliers or other adjustments may therefore be warranted.

Potential edge effects on the QEII-covenanted bush to the north have also not been considered. Clearance will extend to within ~20 m of the covenant, exposing it to risks such as desiccation, windthrow, and weed incursion. A dense buffer of understorey planting along the new edge is recommended, alongside adoption of Option Two of the Pest Management Plan (fencing and pest control across the full 44 ha of forest; refer to the review of the plan, starting on page 21), to build resilience in both the covenant area and adjoining remnants.

Finally, the cumulative effects discussion is overly brief. It does not adequately acknowledge past vegetation clearance at Whitehall Quarry, nor the incremental contribution of the current proposal to ongoing loss of mature tawa forest and bat habitat in the district. A more robust assessment should examine historical clearance, fragmentation trends, and long-term implications for connectivity and bat populations.

Overall, the offset package has potential to achieve no net loss if enhancement planting is delivered to high standards, full animal pest management and fencing of all existing remnants is secured, and benchmarks are recalibrated to reflect mature forest conditions. Legal protection of both existing SNAs and future restoration areas would further align the proposal with policy direction. While the clearance may not compromise the long-term viability of the remaining remnants, ecological equivalence will only be achieved after several decades, and the interim residual effects are greater than the report suggests.

I note that while the Revegetation Plan in Appendix 13 is fairly generic, the sentence describing the background appears to relate to a different project and should be amended or removed. It is later referred to revegetation plantings at 510 Whitford Road, Whitford under the Timeline heading.

Peer Review Comments for Report 2 - Whitehall Quarry Long-Term Expansion Planting Plan

Section 1 – Introduction

Report:

The introduction provides useful context, describing the proposal to plant approximately 30 ha of native vegetation to connect three SNAs and create approximately 86 ha of contiguous habitat in the long term (shown on Figure 1). The proposed planting areas will consist of 12.5 ha Enhancement Planting of current pastureland to the southwest of the quarry. The 12.5 ha area was calculated as required offset mitigation for the removal of 5.45 ha tawa forest and 0.22 ha kanuka scrub as described in the Assessment of Ecological Effects (AEE) reviewed above. Another 1.25 ha will be planted as Ridgeline Planting that will connect the two impacted SNAs and reduce visual effects of the quarry expansion. Lastly, 16.4 ha will be planted in manuka and kanuka in the quarry extension area once the area is retired in approximately 35 years (Quarry Bench Planting).

Peer Review Comment:

This section is well detailed and highlights the corridor function of the proposed planting areas and the overall size of contiguous vegetation post planting. However, I note that the corridor provided by the Ridgeline Plantings will initially just be a narrow strip of vegetation (between ~30-60 m wide) until the Quarry Bench Plantings are established in approximately 35 years' time. I also question the statement on page 1 that the quarry expansion *"will help facilitate the formation of 86 ha of contiguous native vegetation."* While the proposed plantings may indeed contribute to future connectivity, it should be acknowledged that this outcome could be achieved without the clearance of 5.46 ha of mature tawa forest.

I also note that the vegetation loss described in Section 1.3 aligns with the AEE and excludes the additional kanuka scrub clearance that is permitted under the District Plan. As mentioned earlier, I consider this loss should be incorporated into the offset model calculations, as doing so may indicate a need for a slightly larger mitigation planting area. It is positive that the full planting area is proposed to be established immediately, even though clearance of the western remnant will not occur for at least another 15 years. This approach helps to offset the time lag inherent in restoration, allowing the plantings to begin developing ecological values well in advance of the forest removal.

Section 2 – Enhancement Planting

Report:

This section sets clear objectives for enhancement planting, with measures not only detailing planting but also legal protection and deer fencing of the planting area, as well as weed and animal pest control.

Three different planting zones (wetland/watercourse, riparian, and hillslope) are shown on Figure 5, and it is referred to plant lists shown in Tables 2-7 in Appendix 1. Detailed specifications are provided regarding the timing of the planting, plant sourcing, grades and general planting densities, as well as planting and maintenance. It is referred to a separate Pest Management Plan (reviewed below, page 21) for animal pest control and guidelines are provided for weed control.

Peer Review Comment:

The information provided on fencing, timing, site preparation, eco-sourcing, plant numbers and density, as well as the required grades, is comprehensive and well detailed. The requirements for planting and follow-up maintenance are also well covered. It was noted that footnote 2 permits eco-sourcing plants from neighbouring Ecological Districts (EDs), which is fully supported. Additionally, I appreciate the suggestion to consult with an ecologist if any plant species need to be substituted.

The plant lists in Appendix 1 generally include a suitable mix of canopy and understorey species, and the suggested plant numbers are appropriate for effectively covering the riparian zone and hillslope zone. However, it is noted that while Section 2.5.2 suggests plant spacings of 0.5 m for the wetland/watercourse zone, the plant numbers in Table 2 assume 1 m spacings. These wider spacings would result in a longer time to achieve canopy closure unless significant natural regeneration occurs. The plant numbers should therefore be increased and adjusted to the described 0.5 m spacings.

However, I would significantly reduce the number of manuka in Tables 4 and 6, and instead increase the numbers of kanuka, mahoe, mapou and wineberry. It is good to see the limited number of Pittosporum species and these species should not be increased should any plants need to be substituted. Further species should be added to the tables to increase the number of podocarps in the future forest and to create a more diverse canopy cover (e.g., kahikatea in Table 4, swamp maire and titoki in Table 5, lancewood in Table 6, and tanekaha and titoki in Table 7). Common understorey shrubs such as hangehange, rangiora and various coprosma species should be also added to these lists to aim for greater diversity and better forest structure. Further species suitable for the site can be found in the Maungatautari Ecological District Planting Guide prepared by the Waikato Regional Council. A link to Part 1 of this guide is provided in footnote 5. This part excludes the plant list and a link to the more relevant part of the document would be useful. Greater detail on plant spacing for each species would also be beneficial to ensure correct spacing at planting time.

The addition of a section on the installation of photopoints is recommended as a means to monitor the establishment of the plantings. I note that the establishment of photopoints is later mentioned in the Works Programme set out in Section 5, but there is no further detail provided.

Section 3 – Ridgeline Planting

Report:

This section describes the Ridgeline Planting Area and refers to Section 2 for more detailed objectives and planting measures. Section 3.3 includes the comment that the fencing of the adjoining SNA area *“will follow the boundary line unless notified otherwise”*. It is suggested in Section 3.4 not to plant any tawa within 10 m of the quarry cut face as dryer and windier climatic conditions due to climate change may not be tolerated by this species. The same section refers to the planting schedules for this area contained in Appendix 2.

Peer Review Comment:

The recommended plant numbers are appropriate for the planting area. As mentioned for the previous section, I suggest reducing the number of manuka in favour of longer-lived species. The pukatea listed in Table 9 prefers permanently moist soil conditions and is likely unsuitable for this area and could be changed to tanekaha. Further species (as previously mentioned) should be added to Tables 8 and 9 to achieve a greater plant diversity.

The comment regarding tawa and changing climatic conditions in Section 3.4 is noticeable given the proposal to remove 5.46 ha old growth tawa forest in return for a 12.5 ha restoration planting area. It raises the question if tawa forest is easily replanted and calls for dense buffer plantings with understorey species along the newly created bush edges to reduce climatic effects in the remaining forest area.

A minor correction: The area figure in the header of Table 8 should read 12,500 m² instead of 5,555 (which represents the required plant numbers for this area).

Section 4 – Quarry Bench Planting

Report:

This section describes that the Quarry Bench Planting Area will be split into two stages. Stage 1 is 11 ha in size and will be planted 15-20 years following the commencement of quarrying in the expansion area, and Stage 2 will be 5.4 ha in size and will be planted 35-40 years following commencement of quarrying in the area. The objective of this planting area is to provide visual mitigation for the quarry. Planting will occur on the benches within an at least 30 cm deep layer of soil, and because planting is deemed impractical in this area, the proposed plantings include larger grade specimens of manuka and kanuka that are less palatable to browsing pest animals. Other flora species are expected to establish naturally over time.

Peer Review Comment:

Quarry bench planting is deferred until future retirement of the quarry areas, several decades away. The plan currently proposes only manuka and kanuka establishment. While these species will provide some soil stabilisation, manuka, in particular, has limited long-term ecological value compared with tawa

forest. To ensure future ecological function, the plan should specify aided progression to a mixed podocarp–broadleaved forest rather than rely on natural regeneration over time.

While the total suggested number of plants in Appendix 3 is suitable to cover the Stage 1 and 2 planting areas, it is noted that manuka is much shorter-lived than kanuka. The numbers of kanuka should therefore be the same as manuka if not higher.

Section 5 – Works Programme

Report:

This section provides a works programme that outlines planting delivery, staging, survival monitoring, and plant maintenance until 80% canopy cover and weed suppression has been achieved.

Peer Review Comment:

The works programme outlined in Table 1 and the subsequent yearly activity breakdown offer a comprehensive summary of the tasks to be undertaken throughout the year.

I note that this section of the report suggests two to three visits to maintain the plantings in Year 1. Based on my experience, I recommend specifying three visits in Year 1 to ensure the best possible start for the restoration plantings.

Section 6 – Adaptive Management

I generally agree with the statements made in this section; however, adaptive management is not described in operational detail. Clear triggers (e.g., survival <80%, canopy cover <50% after 5 years) and required remedial actions should be included. Without this, “adaptive management” risks being too discretionary.

Appendices (Planting Schedules)

A minor comment: Outdated scientific names have been used for silver fern and mamaku; these could be updated to *Alsophila dealbata* for silver fern and *Sphaeropteris medullaris* for mamaku.

Overall Comment

The Planting Plan provides a solid framework and shows commitment to large-scale restoration and connectivity. However, some improvements could be made:

- Strengthen species mixes with more podocarps and later-successional hardwoods.
- Provide measurable performance standards and clear adaptive management triggers.
- Commit to long-term progression beyond manuka/kanuka dominance for the bench plantings.

With these refinements, the plan could more confidently deliver the stated objective of achieving a resilient 86 ha contiguous indigenous forest network.

Section 1 – Background

Report

The Pest Management Operations Plan (PMOP) identifies pest animal management as a critical component of the effects management for the proposed Whitehall Quarry expansion. It notes that the purpose of the plan is to enhance protection for indigenous vegetation and fauna by reducing pest pressures and supporting habitat for foraging, breeding, and refuge. Baseline pest monitoring has already begun to establish which pest species are present and in what abundance. Ongoing suppression to target levels will be required to safeguard existing and returning native species and ensure they can survive and reproduce successfully.

Peer Review Comment

The introduction appropriately frames pest management as central to achieving ecological outcomes. It would be useful to explicitly tie pest control to the offset ratios calculated in BOAM, since the uplift in credits is heavily dependent on successful pest suppression. The introduction could also acknowledge the risks associated with incomplete implementation (e.g., loss of offset gains if control is not maintained beyond initial years).

Section 2 – Purpose of this plan

Report

Section 2 sets out the purpose and objective of the PMOP. Its purpose is to provide detailed operational guidance for pest control at Whitehall Quarry, including methodologies, schedules, and equipment. The plan is framed around the ecological values of the SNAs, which support very high-value habitat, including roosts for long-tailed bats. Pest and weed management are identified as critical components of the overall effects management strategy, contributing to the rehabilitation of the enhancement planting areas and the protection of indigenous biodiversity. The stated objective of the plan is to suppress target pest species to levels that allow indigenous flora and fauna to thrive within the SNAs and enhancement planting area.

Peer Review Comment

The purpose and objectives of the PMOP are clear, well aligned with the ecological values of the site, and consistent with the recommendations in the AEE. I support the focus on integrated pest and weed management across both key SNAs and the enhancement planting area, as this is essential for long-term habitat resilience.

Section 3 – Pest Management Area

This section provides a useful map of the target area.

Section 4 – Target pest animal species

The table in **Section 4** provides a good overview of the pest animal species to be expected on site. I have no additional comments to make to this section.

Section 5 – Pest Animal Targets and Thresholds

Report

Section 5 outlines performance standards for pest control, with a focus on measurable management targets and thresholds. Targets are defined as maximum allowable residual pest abundances to allow recovery of native species, following Brown *et al.* (2015). Monitoring is primarily based on the Chew Card Index (CCI) for rats and possums, which is preferred over the Tracking Tunnel Index due to its sensitivity at low densities. Camera trap indices are proposed for mustelids and feral cats, though DOC best practice guidelines are still in development. A full set of species-specific targets and thresholds is provided in Table 2, including <5% CCI for rats and possums, 5 detections per 2000 camera hours for mustelids and cats, zero-detection goals for pigs, goats, and deer, and $\geq 80\%$ reduction in wasp nest flight counts.

Section 5.2 describes adaptive management responses to threshold exceedances, requiring intensified control (e.g., additional toxin rounds, more frequent trap checks, or alternative trapping methods) until pest numbers fall below targets. Section 5.3 defines “intensive suppression” as ongoing, multi-method control to maintain pests at low densities and stresses the importance of monitoring to guide adaptive management and measure biodiversity outcomes.

Peer Review Comment

This section is comprehensive and provides a clear framework for measurable, adaptive pest control. The use of thresholds tied to specific monitoring indices is consistent with best practice and provides a transparent trigger for action. The inclusion of a broad suite of pests (rats, possums, mustelids, cats, pigs, goats, deer, and wasps) appropriately reflects the full range of pressures on the site.

The section rightly highlights reinvasion risk. It would be useful to clarify how the plan will manage boundary effects and reinvasion pathways (e.g., through coordination with neighbours, buffer trapping, or landscape-scale initiatives). Although, I note that Map 2 in the following section shows the setup of camera traps and Chew Card lines along the property boundary within the existing SNAs and the planting area.

Section 6 – Pest Animal Monitoring

Report

Section 6 sets out the pest animal monitoring framework. It emphasises ongoing monitoring and adaptive management, with methods tailored to different pest groups shown in Table 3. A baseline monitoring plan has already been implemented, and future monitoring will use the same established lines to reduce setup costs. Map 2 provides an overview of the placement of monitoring devices.

Section 6.2 - Possums, Rats and Mice: Chew card indices (CCI) will be used along six monitoring lines, deployed in June and October (year one) and in October from year two onwards. Monitoring will align with toxin pulses and bird breeding seasons.

Section 6.3 - Mustelids, Feral Cats and Wild Pigs: Camera traps (Cuddelink® with Ezylure® auto-lures) will monitor larger predators continuously. Ten cameras are planned across the two key SNA areas, providing real-time data and reducing labour costs. Camera traps may also detect native species.

Section 6.4 - Ungulates: Monitoring will combine observational surveys, pellet counts, and incidental camera trap detections. Any ungulate presence within fenced areas will trigger immediate ground-based control.

Section 6.5 - Wasps: Monitoring will use DOC's Wasp Nest Flight Count method before and after Vespex control. Control will be repeated if thresholds (≥ 10 wasps per 20 monitoring stations per hour) are exceeded.

Section 6.6 - Rabbits and Hares: Browsing pressure in enhancement planting areas will be assessed using the Modified McLean Scale for years 1–5.

Section 6.7 – 'Smart' Monitoring Technology: Emerging AI-based remote monitoring systems (e.g., CritterPic™, AT510Ai) may be integrated over time to improve detection, reduce labour, and minimise human disturbance.

Peer Review Comment

This section is detailed and provides a strong framework for systematic pest monitoring, with clear methods tailored to each pest group. The inclusion of baseline monitoring and alignment with DOC protocols is commendable, as is the forward-looking adoption of smart technology. Continuous camera trap monitoring is an excellent addition, offering high sensitivity and rapid response capability.

Section 7 – Pest Animal Control

Report

Section 7 outlines that the pest animal control programme for the Whitehall Quarry expansion will cover the entire pest management area, including the SNAs and enhancement planting area, which will operate for 30 years and. An adaptive, integrated approach will be used, combining kill traps (manual

and self-resetting), vertebrate toxin agents (VTAs), ungulate deterrent fencing, and ground-based hunting/fumigation for rabbits, hares, and ungulates.

An initial knockdown pulse of rodents and possums using VTAs is required before any habitat clearance, supported by the installation of traps targeting mustelids, feral cats, rodents, and possums. This aims to reduce pest numbers significantly prior to vegetation removal, increasing the likelihood of successful breeding and recruitment of indigenous species (especially bats).

Control methods for each target species are provided in Table 4 and trapping guidelines are detailed in Table 5, specifying trap types, spacing, lure preferences, servicing requirements, and links to best practice guidelines. VTAs will be deployed via permanent bait station networks across SNAs, supplemented by pulsed operations to prevent toxin or trap shyness. Both first-generation (low secondary poisoning risk) and second-generation (brodifacoum, with higher risk of secondary poisoning) toxins are proposed.

The plan also includes targeted control of *Vespula* wasps using Vespex bait stations, aiming for at least an 80% reduction in wasp abundance to protect bats and invertebrate prey.

Peer Review Comment

The pest animal control programme is comprehensive and adopts an integrated approach consistent with best practice for long-term biodiversity protection. The emphasis on an initial knockdown before vegetation clearance is critical and well justified, particularly for reducing risks to long-tailed bats during breeding and reduces invasion pressure from the affected forest areas to the forest areas on neighbouring properties.

The plan includes detailed operational guidance for trap and toxin deployment (spacing, lure options, maintenance), the adaptive use of pulsed VTAs to minimise toxin shyness, provides clear standards for annual calibration and maintenance of devices, and includes wasp control, which is often overlooked but highly relevant for bat and invertebrate protection.

However, I would suggest tightening the trap network density and spacing devices targeting possums, feral cats and mustelids 100 m apart. The 200 m distance shown in Table 5 may be too coarse for effective suppression of these highly mobile species. I also recommend installing additional devices within the Enhancement Planting Area to ensure sufficient coverage, as the habitat is likely to become increasingly suitable for pest animals as the plantings mature.

The target of 80% reduction of wasp numbers is appropriate, but it would be useful to specify performance monitoring metrics (e.g., pre- and post-treatment counts) as part of annual reporting.

Overall, the pest control section provides a solid operational framework.

Section 8 – Rabbit, hare and ungulate hunting

Report

Section 8 sets out a ground-based hunting programme for rabbits, hares, and ungulates at Whitehall Quarry. A certified and experienced hunting contractor will be engaged to carry out initial and ongoing control, with operations scheduled for autumn and late spring each year.

The programme is divided into four main activities:

1. Ground-based hunting areas – Contractors will survey and remove ungulates across designated areas twice annually.
2. Enhancement planting area – Contractors will target rabbits and hares twice annually for the first five years post-planting, to protect establishing vegetation.
3. Fenced SNAs and enhancement planting areas – Systematic removal of ungulates will be conducted once fences are installed and secure. Any subsequent incursions detected (via trail cameras or observations) will trigger immediate re-survey and removal.
4. Observational surveys – Pest control contractors conducting routine trap and toxin servicing will record ungulate presence during operations in forested management areas.

All hunting activities will follow strict safety protocols, including pre-qualification of contractors, preparation of a Site-Specific Safety Plan (SSSP), and installation of clear signage. Communication with quarry managers and stakeholders (e.g., neighbours, NZ Police) is required prior to hunting. Detailed records (effort hours, observations, kills, missed animals) must be submitted within 48 hours of each hunt. Carcasses of pigs cannot be used for consumption or sale due to risks of secondary poisoning.

Peer Review Comment

This section provides a well-structured framework for controlling rabbits, hares, and ungulates, with clear responsibilities and health and safety requirements. The systematic approach, particularly the initial clearance within fenced areas followed by rapid response to incursions, offers strong protection for the restoration plantings and SNAs.

A comment could be added to support flexibility for increased hunting effort if monitoring detects ongoing incursions of deer, hares, or rabbits.

Overall, this section outlines an appropriate and practical hunting programme.

A minor comment: Section 8 could be a subheading under Section 7 as it describes a form of animal pest control for further species.

Section 9 – Ungulate Deterrent Fence

Report

Section 9 describes that Winstone Aggregates will fund the design, installation, and ongoing maintenance of an ungulate deterrent fence around the key SNAs and enhancement planting area to achieve “ungulate-free” zones. Fence design and placement will be determined collaboratively by pest management managers, contractors, stakeholders, and ecological advisors. Two options are presented on Map 4 for the northern SNA: The fenceline in Option One would follow the back boundary of the property through the forest with hand-constructed posts, while the fence in Option Two would extend up to the northern pasture edge of the forest and include the contiguous forest canopy on private land using existing deer fencing and machinery for installation without removing native flora. Maintenance and repair plans, including the potential use of electrified bottom wires and solar-powered units, are to be established. The Department of Conservation (DOC) deer fencing guidelines provide the recommended fencing specifications.

Peer Review Comment

The section is comprehensive and clearly outlines responsibilities, fence options, and maintenance considerations. However, it would be desirable to specify how the final fence option will be selected and by whom. It would also be useful to include suggested intervals for fence inspections and repairs in this section.

Section 10 – Equipment required

This section provides a helpful overview of the equipment required for annual animal pest control, and the list appears comprehensive. However, I recommend increasing the number of AT220 and SA2 Kat traps, along with associated gear, to one trap per hectare of forest, i.e., spaced approximately 100 m apart rather than 200 m. Additionally, a note should be included to allow for the deployment of extra traps and bait stations in any proposed planting areas that may provide future habitat for pest animals.

Section 11 – Schedule

The schedule in **Section 11** clearly identifies the sequence of activities, with references to both Year 1 and subsequent years. It links key management actions to ecological objectives (e.g., knockdown of possums prior to rodent toxin control). The use of fortnightly and monthly intervals for trap checks demonstrates awareness of seasonal pest activity. Safety and compliance are noted with references to warning signs prior to toxin application.

Section 12 – Signage

Report

This section outlines the legal requirements for erecting VTA (vertebrate toxic agent) warning signs in New Zealand. Signs must be installed at all main property entrances, remain clearly visible, and be

regularly checked, particularly after adverse weather. Minimum sign content includes the toxin name and concentration, bait image, operational dates, caution periods, and contact information for the pest controller or project manager. Signs should also advise on precautions for non-target species, including pets and humans. Examples for specific toxins (Brodifacoum, Double Tap, Diphacinone, Pindone) are provided.

Peer Review Comment

The section is clear and compliant with legal requirements, and it appropriately emphasises safety and visibility. It provides useful links to the required warning signs.

Section 13 – Kauri dieback

The inclusion of this section is commendable; however, I do not expect the presence of kauri at this site.

Section 14 – Data management

Report

This section emphasizes the importance of accurate record-keeping for pest control and monitoring to assess the effectiveness of predator management and guide future decisions. TrapNZ is recommended as the data collection and analysis platform, due to its user-friendliness and ability to track spatial and temporal trends, trap locations, catches, and toxin uptake. Pest controllers are responsible for entering all relevant data into TrapNZ, with training provided if needed. Access is controlled via individual accounts, and all trap checks must record detailed information, including date and time, trap servicer, trap/device details, lure and bait information, catch data (species, numbers, age/sex if known), trap status, and general notes.

Report

The section is thorough and clearly defines data management responsibilities, platform use, and minimum data requirements. It could be specified how often the collected data will be analysed and reported, and if any auditing of data entries will occur to ensure accuracy and completeness.

Section 15 - Review implementation and reporting

Report

This section outlines the requirement for an annual review, update, and approval of the PMOP before the next operational year. The review considers operational budgets, inflation, and market changes, and incorporates budget tracking and communication reports. An annual report, submitted by the end of June, documents pest control activities, progress against objectives and targets, maps of control devices, trap catch and toxin use statistics, data trends, and any operational challenges. The report should be shared with all key stakeholders to assess whether objectives are being met. If monitoring indicates persistent exceedance of thresholds (over two monitoring rounds), additional pest control measures may be needed, with guidance from qualified biosecurity professionals.

Peer Review Comment

The section clearly defines a structured process for annual review and reporting, linking operational actions to objectives and consent requirements. It should be specified who prepares, approves, and distributes the annual report.

2. Overall Conclusion

In summary, the three reports provide a thorough assessment of the proposed quarry expansion and set out a comprehensive package of mitigation, offsetting, and pest management measures. The overall framework is consistent with best ecological practice and shows a clear commitment to restoration and long-term biodiversity enhancement. However, several important refinements are required to ensure that the package delivers a robust and defensible ecological outcome.

In particular, I recommend that:

- The total amount of vegetation clearance (including all kanuka scrub, not only the 0.22 ha within 10 m of wetlands) be included in the BOAM model.
- Model parameters be checked and adjusted to reflect ecologically realistic benchmarks (e.g., mature tawa height of ~20 m and canopy cover >95%).
- The 12.5 ha planting area be increased if recalibrated offset calculations demonstrate a shortfall.
- Long-term pest management, fencing, and legal protection of both existing SNAs and the planting areas be secured through enforceable consent conditions.
- Option Two of the Pest Management Plan (which includes a deer fence surrounding the contiguous forest area on the neighbouring property to the north) be adopted, as this would provide stronger landscape-scale protection and resilience for both the subject remnants and the adjoining covenant area that may be affected by the proposal (i.e., through edge effects).
- The treatment of time lags and cumulative effects on adjoining covenants be strengthened in the assessment.

With these adjustments, the proposed mitigation and offset package has potential to achieve no net loss over the long term and to contribute positively to Waipa's biodiversity corridor. Without them, the certainty of delivering ecological equivalence, particularly for long-tailed bat habitat and mature tawa forest values, remains limited.

Please do not hesitate to contact me should you require any further information.

Kind regards,



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12 January 2026

Hayley Thomas
Waipa District Council
Email: Hayley.Thomas@waipadc.govt.nz



Dear Hayley

Whitehall Quarry Ecologist Review

The following letter provides a response to the Review of the Ecological Reports supporting the Resource Consent Application by Winstone Aggregates for the Whitehall Quarry Expansion at 249 & 253 Whitehall Road, Te Miro - LU/0160/25.

This response is to the recommendations as set out on page 28 of the review letter dated 25 September 2025.

- *The total amount of vegetation clearance (including all kanuka scrub, not only the 0.22 ha within 10 m of wetlands) be included in the BOAM model.*

Response: The removal of the kanuka scrub not included within 10m of the wetlands is a permitted activity under the Waipa District Plan as outlined in section 10 and Appendix 6 of the AEE. Accordingly, as per the application, only 0.22 ha of kanuka scrub is included in the calculations for biodiversity offset.

We consider that this is consistent with planning and RMA practice and it is appropriate to provide offsetting and compensation only for the vegetation removal that requires resource consent and can be assessed rather than permitted activities (as complying with a permitted activity is deemed less than minor or no effect, and thus no significant residual effect).

- *Model parameters be checked and adjusted to reflect ecologically realistic benchmarks (e.g., mature tawa height of ~20 m and canopy cover >95%).*

Response: We consider that the BOAM model parameters, especially the mature Tawa height (at 10 m) is acceptable and appropriate. We have emphasised (at section 10.1.2.2 of the Ecological Effects Assessment) that the time to maturity reflects the time to fruiting and thus is a measure and provides for a functional ecosystem.

The offset calculation is not specifically aimed at replacing a single ecological feature of the broadleaf forest, and other measures (e.g. pest management) have been recommended for bat management on the suggestion from iwi and DOC.

- *The 12.5 ha planting area be increased if recalibrated offset calculations demonstrate a shortfall.*

Response: See response to the above.

Nevertheless, when the BOAM model is adjusted with a 20-year time to maturity and a 95% canopy cover, the 12.5 ha offset area remains acceptable to provide for a no net loss biodiversity outcome. Accordingly, no adjustment to the quantum of offset area is required.

- *Long-term pest management, fencing, and legal protection of both existing SNAs and the planting areas be secured through enforceable consent conditions.*

Response: Appropriate consent conditions will ensure the long-term protection of the SNA's and planting. Over the 35-year consent period, there will be a number of Plan reviews which will provide Council the opportunity to capture the 12.5ha of planting and bring them under the protection mechanisms in the District Plan.

- *Option Two of the Pest Management Plan (which includes a deer fence surrounding the contiguous forest area on the neighbouring property to the north) be adopted, as this would provide stronger landscape-scale protection and resilience for both the subject remnants and the adjoining covenant area that may be affected by the proposal (i.e., through edge effects).*

Response: It is not possible to adopt Option 2 without the agreement of the adjoining landowner and would not be appropriate or good practice to rely on a third party to contribute to the plan. The option 2 was included in the pest management plan to provide the applicant with reason to approach the neighbour for the stated purpose.

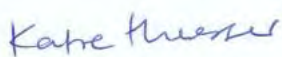
- *The treatment of time lags and cumulative effects on adjoining covenants be strengthened in the assessment.*

Response: The northern quarry expansion purposely leaves a buffer of vegetation along the margin of SNA527a to provide protection to the SNA/covenant edge. We are unclear on the reasoning of time lag being referred to as no loss or impact is anticipated for the neighboring SNA.

This is evidenced by the previous quarry expansions into the northern SNA and the continuing high ecological values of the feature. We are unaware of any planning requirement for Winstone to provide protection for the covenants not on their own land.

Yours sincerely

BOFFA MISKELL LTD



Katie Huesser
Associate Principal | Planner



Ian Boothroyd
Partner | Ecologist

From: [Britta Deichmann](#)
To: [Hayley Thomas](#)
Subject: External Sender: Re: FW: LU/0160/25 - Whitehall Quarry - Ecologist Review
Date: Friday, 30 January 2026 10:44:53 am

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Dear Hayley,

I have reviewed the response letter from Boffa Miskell dated 12 January 2026, which addresses the recommendations set out in my peer review of the ecological reports supporting the Whitehall Quarry Expansion (LU/0160/25).

Having considered their responses, I confirm that my original conclusions and recommendations remain unchanged. In fact, following further reflection, I remain concerned that the proposed offset and effects management package does not adequately address the potential loss of fauna values, particularly in relation to long-tailed bats and other indigenous fauna.

While the response clarifies the applicant's position on several matters, it does not introduce new ecological data or analysis that would materially alter the findings of my review. In particular:

Inclusion of kanuka scrub in offset calculations:

Although the clearance of kanuka scrub outside the wetland setback is a permitted activity under the Waipa District Plan, this does not negate the ecological loss associated with its removal, nor its contribution to cumulative effects. Given the confirmed presence of bush falcons and, in particular, long-tailed bats, and the recognised use of kanuka forest as roosting and commuting habitat, I continue to consider that excluding the majority of this vegetation from offset accounting understates the true scale of habitat loss. If kanuka is being used by bats for roosting or connectivity, its removal is directly relevant to section 6(c) of the RMA and requires appropriate avoidance, mitigation, or offsetting.

BOAM benchmarks, discounting, and ecological equivalence:

The response confirms that the offset model was adjusted using stricter parameters (20-year maturity and 95% canopy cover) and that the 12.5 ha planting area was still considered sufficient; however, no recalculated outputs are provided. More fundamentally, the benchmarks adopted continue to reflect functional milestones rather than the structural attributes of the mature tawa forest being removed. This distinction is particularly important for cavity-dependent species such as long-tailed bats, where ecological equivalence may take many decades to achieve.

I also disagree with the reduction of the standard 3% discount rate to 1% for the western tawa forest. While the early commencement of enhancement planting is a positive component of the proposal, it does not remove the substantial temporal lag associated with the loss of bat habitat. Long-tailed bat roosting habitat depends on the presence of large, mature trees with cavities, cracks, and other roost features that develop over many decades. Even with a minimum 15-year head start, planted tawa forest will remain structurally immature at the time of clearance and will not provide replacement roosting habitat. The reduced discount rate therefore assumes a level of functional equivalence that will not be achieved within the relevant timeframe and materially understates risk and uncertainty. On this basis, the standard 3% discount rate remains appropriate.

Bat-specific effects management:

I remain concerned that the current effects management package does not adequately address the potential loss of bat roost trees. While there is reference to a Long-Tailed Bat Management Plan for the quarry prepared in 2021, which includes clear protocols for how roost trees would be identified, avoided, or managed if discovered during vegetation clearance, there is no provision for artificial roost installation or long-term bat monitoring to assess post-clearance effects. In the absence of these measures, the potential removal of roost trees could result in effects that are more than minor.

Offset quantum and reliance on pest management uplift:

As noted in my review, the offset package becomes ecologically more defensible when the benefits of fencing and long-term pest management across the wider forest remnants are included. However, these gains are contingent on sustained delivery and enforceable commitments. Pest control limited to the immediate site may not be sufficient to materially enhance bat populations, which operate at a broader landscape scale. Consideration could be given to mechanisms that support pest management beyond the site, such as financial compensation in the form of contributions to local Landcare or community-led pest control programmes, to better reflect the spatial ecology of bats.

In addition, the offset model does not explicitly account for the loss of bat roost trees, which represent a particularly high-value and largely irreplaceable component of bat habitat. Recent precedent, including the decision made on 17 October 2025 on an application by the New Zealand Transport Agency to the Environmental Protection Authority under the National Built Environment Act 2023 for the State Highway 1 Cambridge to Piarere Long Term Improvement Project, provides a clear framework for financial compensation associated with bat habitat loss. That decision required compensation to reflect both the loss of mature trees and the removal of bat roosts, including per-hectare payments for trees above 15 cm diameter at breast height, additional payments for trees with occupied roosts, and further compensation for trees with evidence of prior roost use, with pest control expenditure deducted from the total amount. A similar approach could be considered in this case to more appropriately recognise and offset the loss of bat roost habitat, particularly where avoidance is not practicable

Long-term protection mechanisms:

Reliance on future district plan reviews to secure protection of planting areas introduces uncertainty and does not provide the same level of assurance as binding consent conditions or legal protection at the outset. Given the permanent nature of the loss of mature forest within SNAs, I continue to recommend that permanent legal protection of both remaining SNAs and restoration areas be secured through enforceable consent conditions.

Pest Management Plan Option Two:

While I acknowledge the practical constraints associated with implementing pest management measures beyond the applicant's property boundary, my recommendation reflects what would be ecologically optimal to address edge effects and build resilience in the adjoining covenant area. The inability to implement this option does not diminish the validity of the underlying concern.

Time lags and cumulative effects:

The response does not materially address the temporal mismatch between immediate habitat loss and long-term restoration gains, nor the cumulative implications of incremental clearance of mature tawa forest and bat roost habitat over time. These issues remain central to assessing whether no net loss is realistically achieved, particularly in the short to medium term.

Overall, while the proposed mitigation, offset planting, and pest management measures are positive and have the potential to deliver long-term biodiversity gains, the permanent removal of high-value mature forest within SNAs - and the associated risk to bat roost habitat - results in residual ecological effects that are greater than suggested in the applicant's assessment. On this basis, I remain concerned that the effects may be more than minor, and the recommendations in my peer review are therefore maintained.

Please let me know if you would like any aspect of this clarified further or if additional analysis would be helpful.

Thank you,

Britta Deichmann

Director / Senior Ecologist

Ecological Potential Ltd.
415 Te Papatapu Road

From: [Hayley Thomas](#)
To: [Katie Huesser](#)
Cc: [Tyler Sharratt \(Winstone Aggregates\)](#)
Subject: RE: LU/0160/25 - Whitehall Quarry - Ecologist Review
Date: Tuesday, 3 February 2026 9:04:00 am

Morning Katie,

I have heard back from Britta regarding the ecological reports, her assessment and the further information provided. Her detailed email is included below, and she has advised:

In terms of effects status, I consider it too early to definitively conclude whether the effects are no more than minor. My assessment framework is guided by the biodiversity compensation principles set out in Appendix 4 of the NPS-IB, which I do not consider have yet been demonstrably met for long-tailed bats under the current package.

In particular:

- *there is insufficient information to confirm whether occupied or previously occupied bat roost trees will be removed,*
- *I am not convinced that the proposed offset quantum is adequate, given my concerns with the model inputs and assumptions, and*
- *the current package does not adequately address bat-specific risks at a landscape scale.*

The removal of an occupied communal bat roost would almost certainly result in effects that are more than minor. However, at present there is not enough information to confirm whether this will occur, nor sufficient bat-specific mitigation and compensation proposed to confidently conclude that residual effects would be no more than minor.

Britta is asking for the following matters to be addressed to enable her to reassess the effects status:

- inclusion of the kanuka scrub in the calculations
- the recalculated outputs for the modelling and amendment to reflect structural attributes of the mature tawa forest being removed
- use of the standard 3% discount rate
- provision for artificial bat roost installation and long-term bat monitoring
- consideration of (or provision for) financial compensation for bat roost habitat where removal is unavoidable
- agreement to the permanent legal protection of the remaining SNA and enhancement areas
- further information/assessment regarding time lags and cumulative effects to understand whether no net loss is realistically achieved, particularly in the short to medium term

Would you be able to share this with your wider team for consideration and response? If you think it would be helpful, we can arrange a meeting with your ecologists and Britta to talk through the above.

In terms of notification, without the above it is difficult to conclude my report, however it is only the ecology section that is uncompleted, and the other areas (i.e. visual effects, noise, dust etc) are all done. Happy to discuss next steps once you've had a chance to look at this email and its information.

Kind regards

Hayley

.....
Hayley Thomas Project Planner **WAIPĀ DISTRICT COUNCIL**

Hayley.Thomas@waipadc.govt.nz | www.waipadc.govt.nz

PH: 0800 WAIPADC (0800 924 723) | **DDI:** 07 823 381

From: [Ian Boothroyd](#)
To: [Hayley Thomas](#)
Cc: [Jaimee Cannon](#); [Katie Huesser](#)
Subject: External Sender: Whitehall Quarry - Biodiversity Offset Accounting Model
Date: Tuesday, 17 February 2026 10:19:34 pm
Attachments: [Whitehall - biodiversity model - 0.3 discount\(V1\).xlsx](#)

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Hi Hayley,

Ahead of the meeting Wednesday, I attach the Biodiversity Offset Accounting Model (BOAM) excel spreadsheet as per the outputs set out in the Ecological Assessment.

Thanks,

Ian

Ian Boothroyd | Ecologist | Partner | Certified Environmental Practitioner - Ecology Specialist
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Tab colour	Sheet name	Worksheet explanation
	Guide for Impact Model Guide for Offset Model Guide for Offset Model_5 yearly	The Accounting Model comprises a Impact <i>and</i> a Offset Model. Both need to be used to calculate Net Present Biodiversity Value of each Biodiversity Attribute (NPBV) following the proposed Offset Action. The 'Guide' worksheets provide additional information and guidance regarding the input variables for each of the Models. These worksheets should be read in conjunction with the <i>Accounting Model User Manual</i> .
	Impact Model	For each Biodiversity Type of interest, a separate Impact Model needs to be completed (a separate workbook in a new Excel file is required for each Biodiversity Type). Multiple Biodiversity Components can be entered under each Biodiversity Type. The Impact Model must be completed prior to the Offset Model. There are enough tables within this worksheet to account for 30 Biodiversity Components. The tables run vertically down the sheet, and need to be used in consecutive order.
	Offset Model / Offset Model_5 yearly	The Offset Model needs to match the corresponding Impact Model for each Biodiversity Type. Thus, Biodiversity Components and Attributes are automatically copied from the Impact Model to the Offset Model spreadsheets. There are two options for the time period at which to calculate NPBV. If the User decides to calculate NPBV as it accrues at five yearly time-steps both the Offset Model and Offset Model_5 yearly are used. If NPBV is to be calculated only at finite end point, only the Offset Model is required. Both NPBV timescales can be used within the same Biodiversity Component (i.e. one Attribute can be calculated to a finite end point, and another Attribute across five yearly time-steps). Both Offset Models have enough tables to account for 30 Biodiversity Components. However, only the first table is 'live' (coloured). All others are 'turned off' (coloured white) until the corresponding table is utilised within the Impact Model. Within the Offset Model_5 yearly, only the rows needed for Attributes that the User has chosen to calculate using the five yearly time-step will be 'turned on'.

VERSION DATE: 26 March 2015

IMPACT MODEL				
Column		Explanation	Cell content	Cell formulae
Column B		Cell B11. The User is required to input the number assigned to the Biodiversity Type (1 for the first Type, 2 for the second, three for the third etc.). The number assigned to each Biodiversity Type must be the same within the Impact Model and the Offset Models (this auto populates to the Offset Model from the Impact Model). Biodiversity Components and Biodiversity Attributes are automatically numbered accordingly once Cell B11 is populated.		
Column C	Biodiversity Type	Cell C11. Biodiversity Type describes the key biodiversity features of concern found at the Impact Site and can include ecosystems, habitats, or species. Examples include: Lowland podocarp-hardwood forest, coal measures, or a river and riparian ecosystem. Threatened and iconic species and rare or special features may also be listed as Biodiversity Types. Each Biodiversity Type requires its own workbook (copy of the Model template).		
Column C	Biodiversity Component	Identify and input Biodiversity Components to help describe what makes up the Biodiversity Type. Include as many Biodiversity Components as required to adequately represent the Biodiversity Type of concern. Each Biodiversity Type may have several associated Biodiversity Components and each Biodiversity Component requires its own set of Attributes. Examples of components include: vegetation tiers (e.g. ground, understory, canopy, epiphyte, climber), habitat types (e.g. lizard habitat, inanga spawning areas, dune slack wetland), related groups of indigenous species (e.g. vertebrate, invertebrate, bird, bat, lizard), or functional roles (insectivore/predator, nectarivore/pollinator and frugivore/seed disperser). Biodiversity Components are automatically identified numerically in relation to the Biodiversity Type they contribute to (e.g. 1.1, 1.2, 1.3). Biodiversity components must match between the Impact and Offset Models.		
Columns D & E	Biodiversity Attribute	Identify and input Biodiversity Attributes as measures of the condition or the quantity of the Biodiversity Component. The Biodiversity Attributes are the measures balanced in this accounting system to demonstrate no net loss. Biodiversity Attributes have equal weighting reflecting the like for like exchange. Each Biodiversity Component requires at least one Biodiversity Attribute, and may need several, to fully capture 'what we care about'. The tables allow for five Attributes to be entered, but each must have their own row. Attributes are automatically identified alphabetically in relation to the Biodiversity Component they are a part of (e.g. 1.1a, 1.1b, 1.1c). The disaggregated nature of the currency allows for the duplication of a component requiring more than five attributes. Biodiversity attributes must match between the Impact and Offset Models.		
Column F	Measurement Unit	Enter measurement Units for each Biodiversity Attribute. For example, if the Attribute is 'number of adults' the Measurement Unit would be a count. If the Attribute is 'spatial extent of a vegetation tier', the Measurement Unit might be percent. For each attribute, the same measurement units must be used in the Impact and Offset Models.		
Column G	Area of Impact (ha)	Measure and input the extent of habitat or area (ha) supporting the Biodiversity Type and over which the Biodiversity Attribute will be impacted by the proposal. For example, if the Biodiversity Type is a threatened plant species, the area of Impact is the total area (ha) of the vegetation community supporting that species that will be affected by the proposed impact, not just the summed area occupied by individual plants.		
Column H	Benchmark	Input Benchmark values specific to each Biodiversity Attribute. Measurements of ecological condition or quality require reference to a benchmark state that reflects a 'natural' or 'pristine' or other desirable condition. The benchmark provides an objective framework, and a common reference point, for evaluating biodiversity losses and gains across Impact and Offset Sites. It may be necessary to employ multiple benchmarks relevant to different Biodiversity Attributes. Benchmarks are ideally measured, using the same units as for attributes, from a real site of the same vegetation community type of the Impact and Offset Site, and be a site that has been under sustained conservation management or be of the highest possible condition (and not simply a site reflective of general condition of other sites within the area). Where such a site does not exist, ecologists with expertise relevant to the Biodiversity Attribute being measured may be able to describe an appropriate Benchmark value. Expert derived estimates will likely require input from a number of ecologists whose expertise spans the relevant Biodiversity Components and Attributes. The overall condition of the Benchmark site is required to be equal to or greater than the overall condition of the Impact and Offset Sites. The same Measurement Unit (Column F) must be used to describe the Biodiversity Attribute within the Benchmark, Impact and Offset sites.		
Column I	Measure <u>prior to</u> Impact	Measure and input the measured value of the Biodiversity Attribute at the Impact Site prior to the proposed Impact occurring. This is the measure of biodiversity loss in the loss/gain calculation. The value is expressed in the stated Measurement Unit (Column F), using the same method of measurement as for the Benchmark. If the Impact to the Attribute is total loss, enter a value of zero.		
Column J	Measure <u>after</u> Impact	Estimate and input the predicted value of the Attribute at the Impact Site following the proposed Impact. The value is expressed in the stated Measurement Unit (Column F), using the same method of measurement as for the Benchmark. The quantum of Impact may be derived from the Assessment of Environmental Effects, or predictive models may be needed to inform this value. Experts with expertise relevant to each Biodiversity Attribute may be able to confidently estimate post Impact values.		
Column K	Biodiversity value	This is the calculated value of the Biodiversity Attribute at the Impact Site following the Impact. Attribute biodiversity value is the measure of the Attribute after the Impact, relative to the measure prior to the Impact, and adjusted in proportion to the Benchmark. Any Attribute value greater than the Benchmark value is truncated to 1 within the equation. This change in biodiversity value is then multiplied across the area of proposed Impact.	Equation to adjust change so that the pre and post impact values are in proportion to the Benchmark. Values prior (Column I) and post Impact (Column J) are truncated to 1 if these values are greater than the Benchmark. Additional instructions are used within this equation to return 'Not calculated' if the Attribute Value has not been calculated.	=IFERROR(IF(ISBLANK(J15),"", (IF(J15<H15,J15/H15,1)-IF(I15<H15,I15/H15,1)))*(G15),"Not calculated")

IMPACT MODEL

Key:

	User input
	Auto-filled
	BIODIVERSITY TYPE
	Habitat

READ ME:

Note 1: The Impact Model must be populated before data is entered into the Offset Model.

Note 2: Use a new workbook for each additional Biodiversity Type.

Steps 1 & 2: Input the Biodiversity Type to be accounted for into Cell C11 and corresponding number (e.g. 1 if it the first Biodiversity Type, 2, if it is the second etc.) into Cell B11..

Step 3: Input the first Biodiversity Component into Cell C15.

Steps 4–10: Work through the Impact Model for each Biodiversity Attribute (Columns E–L) entering values into all cells coloured light brown. Cells coloured light green will auto-populate.

Step 11: Repeat Steps 4–10 for as many Biodiversity Attributes as required.

Step 12: Repeat Steps 3–10 for as many Biodiversity Components as required (scrolling down the sheet).

This section captures which elements of biodiversity, and over what area, will be impacted by the proposal						This section is where the change in measure of each Biodiversity Attribute due to the proposed Impact is quantified, and Attribute Biodiversity Value calculated. Inputs are derived from direct measures, existing data or models where available, or expert estimated predictions			
	Biodiversity Component	Biodiversity Attribute		Measurement Unit	Area of Impact (ha)	Benchmark	Measure <u>prior</u> to Impact	Measure <u>after</u> Impact	Biodiversity Value
0.1	Northern tawa forest	0.1a	Natve:Exotic	% native	2.6	100	98	0	-2.55
		0.1b	Native species diversity	No.species	2.6	46	17	0	-0.96
		0.1c	Canopy cover	%	2.6	80	95	0	-2.60
		0.1d	Height to maturity (tawa)	metres	2.6	10	10	0	-2.60
		0.1e	Understorey	% native	2.6	70	10	0	-0.37

This section captures which elements of biodiversity, and over what area, will be impacted by the proposal						This section is where the change in measure of each Biodiversity Attribute due to the proposed Impact is quantified, and Attribute Biodiversity Value calculated. Inputs are derived from direct measures, existing data or models where available, or expert estimated predictions			
	Biodiversity Component	Biodiversity Attribute		Measurement Unit	Area of Impact (ha)	Benchmark	Measure <u>prior</u> to Impact	Measure <u>after</u> Impact	Biodiversity Value
0.2	Kanuka scrub (with tawa)	0.2a	Natve:Exotic	% native	0.22	100	75	0	-0.17
		0.2b	Native species diversity	No.species	0.22	46	6	0	-0.03
		0.2c	Canopy cover	%	0.22	80	75	0	-0.21
		0.2d	Height to maturity (tawa)	metres	0.22	10	0	0	0.00
		0.2e	Understorey	% native	0.22	70	5	0	-0.02

This section captures which elements of biodiversity, and over what area, will be impacted by the proposal						This section is where the change in measure of each Biodiversity Attribute due to the proposed Impact is quantified, and Attribute Biodiversity Value calculated. Inputs are derived from direct measures, existing data or models where available, or expert estimated predictions			
	Biodiversity Component	Biodiversity Attribute		Measurement Unit	Area of Impact (ha)	Benchmark	Measure <u>prior</u> to Impact	Measure <u>after</u> Impact	Biodiversity Value
0.3	Tawa Tier	0.3a	Teir 1	No. species	2.6	1	2	0	-2.60
		0.3b	Tier 2	No. species	2.6	4	2	0	-1.30
		0.3c	Tier 3	No. species	2.6	12	6	0	-1.30
		0.3d	Tier 4	No. species	2.6	15	9	0	-1.56
		0.3e	Tier 5	No. species	2.6	55	12	0	-0.57

OFFSET MODEL_5 yearly

Use the Offset Model_5 yearly when calculating NPBV across five yearly time-steps

Column		Explanation	Cell content	Cell formulae
Column B		Cell B11. The Offset Model_5 yearly will auto populate the same number as was entered in the Impact Model (cell B11). Biodiversity Attributes (Column D) are automatically numbered accordingly once Cell B11 is auto-populated.	Contains a Lookup formula to find matching information in the Offset Impact Model in order to auto-populate this cell.	='Impact Model'!B11
Column C	Biodiversity Type	Cell C11. The Offset Model_5 yearly will auto populate this cell with the text that was entered in the Impact Model (Cell). See the 'Guide for Impact Model' for further explanation on Biodiversity Type.	Contains a Lookup formula to find matching information in the Impact Model in order to auto-populate this cell.	=VLOOKUP(B11,'Impact Model_1'!\$B\$10:\$N\$332,2,FALSE)
Column A	Biodiversity Component	The Offset Model_5 yearly will auto populate this cell with the text that was entered in the Impact Model (Cell). The Biodiversity Component is repeated here to assist in keeping track of calculations between the two Offset Models when calculating NPBV to both a finite end point and a five yearly time-step within the same Biodiversity Component.		
Column C	Measure prior to Offset	Measure and input the Biodiversity Attribute measure at the Offset Site prior to the proposed Offset Action) being implemented, expressed in the Measurement Unit (Column F, Offset Model). The methods/models used to measure the Attribute at the Offset Site need to be identical to those used to measure the same Attribute at the Impact Site.		
Columns D (F, H, J, L, N, P, R)	Measure at Year 1 (5, 15, 20, 25, 30, 35)	Predict and input the Biodiversity Attribute measure at the Offset Site following the proposed Offset Action expressed in the Measurement Unit (Column F, Offset Model spreadsheet), at Year X following the implementation of the Offset Action. Predictive models or informed expert opinion may be needed to inform these measures.		
Columns E (G, I, K, M, O, Q, S)	NPBV at Year 1 (5, 15, 20, 25, 30, 35)	Net Present Biodiversity Value (NPBV) is determined for each Attribute by calculating the difference between the biodiversity value at the Offset Site and at the Impact Site (for each Attribute) to give the net change in biodiversity value as it accrues over time (at five yearly intervals). A no net loss biodiversity exchange is demonstrated when this value is equal to or greater than zero. The value when the NPBV value is equal or greater than zero, is exported to the Offset Model spreadsheet (Column R). If an equal or greater than zero NPBV is not reached, the NPBV at Year 35 is exported into the Offset Model spreadsheet (Column R).	The equation contains an IF formula that applies the correct multiplier dependent on the confidence level entered into the Offset Model spreadsheet (Column J). The formula for Year 1 calculates the difference between the Biodiversity Attribute measure prior to the offset and the measure at Year 1 for that Biodiversity Attribute. The formulae for Years 5–35 calculate the difference between the Biodiversity Attribute measure at the time interval being calculated and the Biodiversity Attribute measure at the prior time interval. The biodiversity value at the prior time interval is added to the biodiversity value of the time interval being calculated to return the accrued biodiversity value. The remainder of the equation calculates the NPBV at each time interval. The time period embedded in the equation is changed at each time interval to correspond with the relevant time-step.	Equation for Year 1: '=IF('Offset Model '!'\$K15="Five yearly time-step",IFERROR(IF(ISBLANK(D15),"",((IF('Offset Model '!'\$J15="Low confidence >50% <75%",(IF(D15<'Offset Model '!'\$G15,D15/'Offset Model '!'\$G15,1)-IF(\$C15<'Offset Model '!'\$G15,\$C15/'Offset Model '!'\$G15,1))*0.62,IF('Offset Model '!'\$J15="Confident 75-90%",(IF(D15<'Offset Model '!'\$G15,D15/'Offset Model '!'\$G15,1)-IF(\$C15<'Offset Model '!'\$G15,\$C15/'Offset Model '!'\$G15,1))*0.825,IF('Offset Model '!'\$J15="Very confident >90%",(IF(D15<'Offset Model '!'\$G15,D15/'Offset Model '!'\$G15,1)-IF(\$C15<'Offset Model '!'\$G15,\$C15/'Offset Model '!'\$G15,1))*0.955))))/(1+'Offset Model '!'\$E\$11)^1*'Offset Model '!'\$I15)+('Offset Model '!'\$Q15),"",") Equation for Years 5–35 '=(E15-'Offset Model '!'Q15)+IF('Offset Model '!'\$K15="Five yearly time-step",IFERROR(IF(ISBLANK(F15),"",((IF('Offset Model '!'\$J15="Low confidence >50% <75%",(IF(F15<'Offset Model '!'\$G15,F15/'Offset Model '!'\$G15,1)-IF(\$D15<'Offset Model '!'\$G15,\$D15/'Offset Model '!'\$G15,1))*0.62,IF('Offset Model '!'\$J15="Confident 75-90%",(IF(F15<'Offset Model '!'\$G15,F15/'Offset Model '!'\$G15,1)-IF(\$D15<'Offset Model '!'\$G15,\$D15/'Offset Model '!'\$G15,1))*0.825,IF('Offset Model '!'\$J15="Very confident >90%",(IF(F15<'Offset Model '!'\$G15,F15/'Offset Model '!'\$G15,1)-IF(\$D15<'Offset Model '!'\$G15,\$D15/'Offset Model '!'\$G15,1))*0.955)))))/((1+'Offset Model '!'\$E\$11)^5)*('Offset Model '!'\$I15))+('Offset Model '!'\$Q15),"",")
Columns V-AC	NPBV at Year 1 (5, 15, 20, 25, 30, 35)	These columns are used to create a contiguous range of cells to enable the equation that imports these values into the Offset Model (Offset Model, Cell R15). The User should not make any alterations to these columns.	These columns have been hidden.	V=E15, W=G15, X=I15, Y=K15, Z=M15, AA=O15, AB=Q15, AC=S15

OFFSET MODEL

Key

	User Input		Dropdown list
	Auto-filled		Not Required

	BIODIVERSITY TYPE		DISCOUNT RATE
0	#N/A		0.03

READ ME:

Step 1: Biodiversity Attributes must be entered into the Impact Model prior to commencing input into the Offset Model.
Step 2: Input the Biodiversity Type Identifier (e.g. 1 if it the first Biodiversity Type, 2, if it is the second etc.) into Cell B11. The same identifying number needs to be used for the same Biodiversity Type within the Impact and Offset Models. The Biodiversity Type (Cell C11) will be auto-populated.
Step 3: Input time preference Discount Rate (Cell E11)
Step 4: Biodiversity Components will be auto-populated once Cell B11 is populated.
Step 5: Biodiversity Attributes will be auto-populated once Cell B11 is populated.
Step 6: Work through accounting model for each Biodiversity Attribute entering values into light brown cells. At Column K choose method of accounting for time and follow instructions. If using a finite end point, continue on this sheet. If calculating the offset as accrued over time use the Offset Model_5 yearly worksheet.
Step 7: Repeat for additional Biodiversity Components (scrolling down the sheet)

		This section captures which elements of biodiversity are to be accounted for, and the benchmark value for the Attribute. The information matches that in the Impact Model				These cells provide information about the proposed Offset Actions			Calculations can be made for a finite end point, or at five yearly time-steps over 35 years. Indicate preference in Column K and Follow the instructions in Column L		This section is where the marginal change in the measure of Biodiversity Attribute due to the Offset Action is quantified. Inputs are derived from direct measure, existing data or models where available, or expert estimated predictions. Attribute Biodiversity Value at the Offset Site is compared to the Attribute Biodiversity Value at the Impact Site to calculate the Net Present Biodiversity Value for each Attribute						This is the average Net Present Biodiversity Value for the Biodiversity Component
	Biodiversity Component	Biodiversity Attribute		Measurement Unit	Benchmark	Proposed Offset Actions	Offset area (ha)	Confidence in Offset Actions			Measure prior to Offset	Measure after Offset	Time till endpoint (years)	Biodiversity Value at Offset Site	Biodiversity Value at Impact Site	Attribute Net Present Biodiversity Value	Component Net Present Biodiversity Value
0.1	Northern tawa forest	0.1a	Native:Exotic	% native	100	Weeding, planting, pest animal control	7	Confident 75-90%	Finite end point	Continue to Column M	15	100	5	4.23	-2.55	1.69	1.94
		0.1b	Native species diversity	No.species	46	Weeding, planting, pest animal control	7	Very confident >90%	Finite end point	Continue to Column M	5	25	5	2.51	-0.96	1.55	
		0.1c	Canopy cover	%	80	Weeding, planting, pest animal control	7	Very confident >90%	Finite end point	Continue to Column M	2	80	5	5.62	-2.60	3.02	
		0.1d	Height to maturity (tawa)	metres	10	Weeding, planting, pest animal control	7	Confident 75-90%	Finite end point	Continue to Column M	0	10	20	3.20	-2.60	0.60	
		0.1e	Understorey	% native	70	Weeding, planting, pest animal control	7	Confident 75-90%	Finite end point	Continue to Column M	0	70	20	3.20	-0.37	2.83	
		This section captures which elements of biodiversity are to be accounted for, and the benchmark value for the Attribute. The information matches that in the Impact Model				These cells provide information about the proposed Offset Actions			Calculations can be made for a finite end point, or at five yearly time-steps over 35 years. Indicate preference in Column K and Follow the instructions in Column L		This section is where the marginal change in the measure of Biodiversity Attribute due to the Offset Action is quantified. Inputs are derived from direct measure, existing data or models where available, or expert estimated predictions. Attribute Biodiversity Value at the Offset Site is compared to the Attribute Biodiversity Value at the Impact Site to calculate the Net Present Biodiversity Value for each Attribute						This is the average Net Present Biodiversity Value for the Biodiversity Component
	Biodiversity Component	Biodiversity Attribute		Measurement Unit	Benchmark	Proposed Offset Actions	Offset area (ha)	Confidence in Offset Actions			Measure prior to Offset	Measure after Offset	Time till endpoint (years)	Biodiversity Value at Offset Site	Biodiversity Value at Impact Site	Attribute Net Present Biodiversity Value	Component Net Present Biodiversity Value
0.2	Kanuka scrub (with tawa)	0.2a	Native:Exotic	% native	100	Weeding, planting, pest animal control	0.5	Confident 75-90%	Finite end point	Continue to Column M	15	100	5	0.30	-0.17	0.14	0.18
		0.2b	Native species diversity	No.species	46	Weeding, planting, pest animal control	0.5	Very confident >90%	Finite end point	Continue to Column M	5	25	5	0.18	-0.03	0.15	
		0.2c	Canopy cover	%	80	Weeding, planting, pest animal control	0.5	Very confident >90%	Finite end point	Continue to Column M	2	80	5	0.40	-0.21	0.20	
		0.2d	Height to maturity (tawa)	metres	10	Weeding, planting, pest animal control	0.5	Confident 75-90%	Finite end point	Continue to Column M	0	10	20	0.23	0.00	0.23	
		0.2e	Understorey	% native	70	Weeding, planting, pest animal control	0.5	Confident 75-90%	Finite end point	Continue to Column M	0	70	20	0.23	-0.02	0.21	
		This section captures which elements of biodiversity are to be accounted for, and the benchmark value for the Attribute. The information matches that in the Impact Model				These cells provide information about the proposed Offset Actions			Calculations can be made for a finite end point, or at five yearly time-steps over 35 years. Indicate preference in Column K and Follow the instructions in Column L		This section is where the marginal change in the measure of Biodiversity Attribute due to the Offset Action is quantified. Inputs are derived from direct measure, existing data or models where available, or expert estimated predictions. Attribute Biodiversity Value at the Offset Site is compared to the Attribute Biodiversity Value at the Impact Site to calculate the Net Present Biodiversity Value for each Attribute						This is the average Net Present Biodiversity Value for the Biodiversity Component
	Biodiversity Component	Biodiversity Attribute		Measurement Unit	Benchmark	Proposed Offset Actions	Offset area (ha)	Confidence in Offset Actions			Measure prior to Offset	Measure after Offset	Time till endpoint (years)	Biodiversity Value at Offset Site	Biodiversity Value at Impact Site	Attribute Net Present Biodiversity Value	Component Net Present Biodiversity Value
0.3	Tawa Tier	0.3a	Teir 1	No. species	1	Weeding, planting, pest animal control	6	Very confident >90%	Finite end point	Continue to Column M	0	2	40	1.76	-2.60	-0.84	0.90
		0.3b	Tier 2	No. species	4	Weeding, planting, pest animal control	6	Very confident >90%	Finite end point	Continue to Column M	0	4	20	3.17	-1.30	1.87	
		0.3c	Tier 3	No. species	12	Weeding, planting, pest animal control	6	Very confident >90%	Finite end point	Continue to Column M	0	10	20	2.64	-1.30	1.34	
		0.3d	Tier 4	No. species	15	Weeding, planting, pest animal control	6	Very confident >90%	Finite end point	Continue to Column M	0	13	20	2.75	-1.56	1.19	
		0.3e	Tier 5	No. species	55	Weeding, planting, pest animal control	6	Confident 75-90%	Finite end point	Continue to Column M	0	30	20	1.49	-0.57	0.93	

From: [Ian Boothroyd](#)
To: [Hayley Thomas](#)
Cc: [Jaimee Cannon](#); [Katie Huesser](#)
Subject: External Sender: RE: Whitehall Quarry - Biodiversity Offset Accounting Model
Date: Tuesday, 17 February 2026 10:33:56 pm
Attachments: [Whitehall - biodiversity model - 0.1 discount.xlsx](#)

You don't often get email from ian.boothroyd@boffamiskell.co.nz. [Learn why this is important](#)

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And here is the BOAM for the Western Tawa Forest at Whitehall Quarry.

From: Ian Boothroyd
Sent: Tuesday, 17 February 2026 10:19 pm
To: Hayley Thomas
Cc: Jaimee Cannon; Katie Huesser
Subject: Whitehall Quarry - Biodiversity Offset Accounting Model

Hi Hayley,

Ahead of the meeting Wednesday, I attach the Biodiversity Offset Accounting Model (BOAM) excel spreadsheet as per the outputs set out in the Ecological Assessment.

Thanks,

Ian

Ian Boothroyd | Ecologist | Partner | Certified Environmental Practitioner - Ecology Specialist
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Tab colour	Sheet name	Worksheet explanation
	Guide for Impact Model Guide for Offset Model Guide for Offset Model_5 yearly	The Accounting Model comprises a Impact <i>and</i> a Offset Model. Both need to be used to calculate Net Present Biodiversity Value of each Biodiversity Attribute (NPBV) following the proposed Offset Action. The 'Guide' worksheets provide additional information and guidance regarding the input variables for each of the Models. These worksheets should be read in conjunction with the <i>Accounting Model User Manual</i> .
	Impact Model	For each Biodiversity Type of interest, a separate Impact Model needs to be completed (a separate workbook in a new Excel file is required for each Biodiversity Type). Multiple Biodiversity Components can be entered under each Biodiversity Type. The Impact Model must be completed prior to the Offset Model. There are enough tables within this worksheet to account for 30 Biodiversity Components. The tables run vertically down the sheet, and need to be used in consecutive order.
	Offset Model / Offset Model_5 yearly	The Offset Model needs to match the corresponding Impact Model for each Biodiversity Type. Thus, Biodiversity Components and Attributes are automatically copied from the Impact Model to the Offset Model spreadsheets. There are two options for the time period at which to calculate NPBV. If the User decides to calculate NPBV as it accrues at five yearly time-steps both the Offset Model and Offset Model_5 yearly are used. If NPBV is to be calculated only at finite end point, only the Offset Model is required. Both NPBV timescales can be used within the same Biodiversity Component (i.e. one Attribute can be calculated to a finite end point, and another Attribute across five yearly time-steps). Both Offset Models have enough tables to account for 30 Biodiversity Components. However, only the first table is 'live' (coloured). All others are 'turned off' (coloured white) until the corresponding table is utilised within the Impact Model. Within the Offset Model_5 yearly, only the rows needed for Attributes that the User has chosen to calculate using the five yearly time-step will be 'turned on'.

VERSION DATE: 26 March 2015

IMPACT MODEL				
Column		Explanation	Cell content	Cell formulae
Column B		Cell B11. The User is required to input the number assigned to the Biodiversity Type (1 for the first Type, 2 for the second, three for the third etc.). The number assigned to each Biodiversity Type must be the same within the Impact Model and the Offset Models (this auto populates to the Offset Model from the Impact Model). Biodiversity Components and Biodiversity Attributes are automatically numbered accordingly once Cell B11 is populated.		
Column C	Biodiversity Type	Cell C11. Biodiversity Type describes the key biodiversity features of concern found at the Impact Site and can include ecosystems, habitats, or species. Examples include: Lowland podocarp-hardwood forest, coal measures, or a river and riparian ecosystem. Threatened and iconic species and rare or special features may also be listed as Biodiversity Types. Each Biodiversity Type requires its own workbook (copy of the Model template).		
Column C	Biodiversity Component	Identify and input Biodiversity Components to help describe what makes up the Biodiversity Type. Include as many Biodiversity Components as required to adequately represent the Biodiversity Type of concern. Each Biodiversity Type may have several associated Biodiversity Components and each Biodiversity Component requires its own set of Attributes. Examples of components include: vegetation tiers (e.g. ground, understory, canopy, epiphyte, climber), habitat types (e.g. lizard habitat, inanga spawning areas, dune slack wetland), related groups of indigenous species (e.g. vertebrate, invertebrate, bird, bat, lizard), or functional roles (insectivore/predator, nectarivore/pollinator and frugivore/seed disperser). Biodiversity Components are automatically identified numerically in relation to the Biodiversity Type they contribute to (e.g. 1.1, 1.2, 1.3). Biodiversity components must match between the Impact and Offset Models.		
Columns D & E	Biodiversity Attribute	Identify and input Biodiversity Attributes as measures of the condition or the quantity of the Biodiversity Component. The Biodiversity Attributes are the measures balanced in this accounting system to demonstrate no net loss. Biodiversity Attributes have equal weighting reflecting the like for like exchange. Each Biodiversity Component requires at least one Biodiversity Attribute, and may need several, to fully capture 'what we care about'. The tables allow for five Attributes to be entered, but each must have their own row. Attributes are automatically identified alphabetically in relation to the Biodiversity Component they are a part of (e.g. 1.1a, 1.1b, 1.1c). The disaggregated nature of the currency allows for the duplication of a component requiring more than five attributes. Biodiversity attributes must match between the Impact and Offset Models.		
Column F	Measurement Unit	Enter measurement Units for each Biodiversity Attribute. For example, if the Attribute is 'number of adults' the Measurement Unit would be a count. If the Attribute is 'spatial extent of a vegetation tier', the Measurement Unit might be percent. For each attribute, the same measurement units must be used in the Impact and Offset Models.		
Column G	Area of Impact (ha)	Measure and input the extent of habitat or area (ha) supporting the Biodiversity Type and over which the Biodiversity Attribute will be impacted by the proposal. For example, if the Biodiversity Type is a threatened plant species, the area of Impact is the total area (ha) of the vegetation community supporting that species that will be affected by the proposed impact, not just the summed area occupied by individual plants.		
Column H	Benchmark	Input Benchmark values specific to each Biodiversity Attribute. Measurements of ecological condition or quality require reference to a benchmark state that reflects a 'natural' or 'pristine' or other desirable condition. The benchmark provides an objective framework, and a common reference point, for evaluating biodiversity losses and gains across Impact and Offset Sites. It may be necessary to employ multiple benchmarks relevant to different Biodiversity Attributes. Benchmarks are ideally measured, using the same units as for attributes, from a real site of the same vegetation community type of the Impact and Offset Site, and be a site that has been under sustained conservation management or be of the highest possible condition (and not simply a site reflective of general condition of other sites within the area). Where such a site does not exist, ecologists with expertise relevant to the Biodiversity Attribute being measured may be able to describe an appropriate Benchmark value. Expert derived estimates will likely require input from a number of ecologists whose expertise spans the relevant Biodiversity Components and Attributes. The overall condition of the Benchmark site is required to be equal to or greater than the overall condition of the Impact and Offset Sites. The same Measurement Unit (Column F) must be used to describe the Biodiversity Attribute within the Benchmark, Impact and Offset sites.		
Column I	Measure <u>prior to</u> Impact	Measure and input the measured value of the Biodiversity Attribute at the Impact Site prior to the proposed Impact occurring. This is the measure of biodiversity loss in the loss/gain calculation. The value is expressed in the stated Measurement Unit (Column F), using the same method of measurement as for the Benchmark. If the Impact to the Attribute is total loss, enter a value of zero.		
Column J	Measure <u>after</u> Impact	Estimate and input the predicted value of the Attribute at the Impact Site following the proposed Impact. The value is expressed in the stated Measurement Unit (Column F), using the same method of measurement as for the Benchmark. The quantum of Impact may be derived from the Assessment of Environmental Effects, or predictive models may be needed to inform this value. Experts with expertise relevant to each Biodiversity Attribute may be able to confidently estimate post Impact values.		
Column K	Biodiversity value	This is the calculated value of the Biodiversity Attribute at the Impact Site following the Impact. Attribute biodiversity value is the measure of the Attribute after the Impact, relative to the measure prior to the Impact, and adjusted in proportion to the Benchmark. Any Attribute value greater than the Benchmark value is truncated to 1 within the equation. This change in biodiversity value is then multiplied across the area of proposed Impact.	Equation to adjust change so that the pre and post impact values are in proportion to the Benchmark. Values prior (Column I) and post Impact (Column J) are truncated to 1 if these values are greater than the Benchmark. Additional instructions are used within this equation to return 'Not calculated' if the Attribute Value has not been calculated.	=IFERROR(IF(ISBLANK(J15),"", (IF(J15<H15,J15/H15,1)-IF(I15<H15,I15/H15,1)))*(G15),"Not calculated")

IMPACT MODEL

Key:

	User input
	Auto-filled
	BIODIVERSITY TYPE
	Habitat

READ ME:

Note 1: The Impact Model must be populated before data is entered into the Offset Model.

Note 2: Use a new workbook for each additional Biodiversity Type.

Steps 1 & 2: Input the Biodiversity Type to be accounted for into Cell C11 and corresponding number (e.g. 1 if it the first Biodiversity Type, 2, if it is the second etc.) into Cell B11..

Step 3: Input the first Biodiversity Component into Cell C15.

Steps 4–10: Work through the Impact Model for each Biodiversity Attribute (Columns E–L) entering values into all cells coloured light brown. Cells coloured light green will auto-populate.

Step 11: Repeat Steps 4–10 for as many Biodiversity Attributes as required.

Step 12: Repeat Steps 3–10 for as many Biodiversity Components as required (scrolling down the sheet).

This section captures which elements of biodiversity, and over what area, will be impacted by the proposal						This section is where the change in measure of each Biodiversity Attribute due to the proposed Impact is quantified, and Attribute Biodiversity Value calculated. Inputs are derived from direct measures, existing data or models where available, or expert estimated predictions			
Biodiversity Component	Biodiversity Attribute		Measurement Unit	Area of Impact (ha)	Benchmark	Measure <u>prior</u> <u>to</u> Impact	Measure <u>after</u> Impact	Biodiversity Value	
0.1	Western tawa forest	0.1a	Native:Exotic	% native	2.86	100	98	0	-2.80
		0.1b	Native species diversity	No.species	2.86	46	17	0	-1.06
		0.1c	Canopy cover	%	2.86	80	95	0	-2.86
		0.1d	Height to maturity (tawa)	metres	2.86	10	10	0	-2.86
		0.1e	Understorey	% native	2.86	70	10	0	-0.41

OFFSETS MODEL				
Use the Offset Model when calculating NPBV for a finite end point				
Column	Explanation		Cell content	Cell formulae
Column B		Cell B11. The Offsets Model will auto populate with the same number as was entered in the Impact Model. Biodiversity Attributes (Column D) are automatically numbered accordingly once Cell B11 is auto-populated.	Contains a Lookup formula to find matching information in the Impact Model in order to auto-populate this cell.	= 'Impact Model'!B11
Column C	Biodiversity Type	Cell C11. The Offsets Model will auto populate this cell with the text entered in Cell C11 of the Impact Model. See the Guide for Impact Model for further explanation on Biodiversity Type.	Contains a Lookup formula to find matching information in the Impact Model in order to auto-populate this cell.	=VLOOKUP(B11,'Impact Model'!\$B\$10:\$N\$340,2,FALSE)
Column E	Discount Rate	Cell E11. Enter a discrete discount rate before any other values are entered into the Offset Model. The same discount rate applies to all Biodiversity Types, Components, and Attributes in the Offset Model. For more discussion on discount rates see the <i>Good Practice Guidance</i> .		
Column C	Biodiversity Component	For Columns C, D, F, and G, the Offsets Model will auto populate the corresponding value from the Impact Model. See the Guide for Impact Model for further explanation on Biodiversity Components, Biodiversity Attributes, and Measurement Units. Biodiversity Components and Attributes are automatically assigned a unique identifier (Columns B and D) once Cell B11 is auto populated from the Impact Model.	Contains a Lookup formula to find matching information from the corresponding Impact Model in order to auto-populate these cells.	=VLOOKUP(B15,'Impact Model'!\$B\$14:\$N\$340,2,FALSE)
Columns D & E	Biodiversity Attribute			=VLOOKUP(D15,'Impact Model_1'!\$D\$15:\$N\$340,2,FALSE)
Column F	Measurement Unit		Contains an array formula to find matching information from the corresponding Impact Model and auto-populate this cell. NB: If cell is unprotected, use ctrl+shift+enter to move out of cell rather than just enter to avoid breaking the array formula.	{=INDEX('Impact Model'!\$D\$15:\$F\$340,MATCH(D15&E15,'Impact Model'!\$D\$15:\$D\$340&'Impact Model'!\$E\$15:\$E\$340,0),3)}
Column G	Benchmark	The Offsets Model will auto populate this cell with the same value as was entered into the Impact Model (Column H, Impact Model). See the Guide for Impact Model for further explanation on Benchmarks.	Contains an array formula to find matching information from the corresponding Impact Model and auto-populate this cell. NB: If cell is unprotected, use ctrl+shift+enter to move out of cell rather than just enter to avoid breaking the array formula.	{=INDEX('Impact Model'!\$D\$15:\$H\$340,MATCH(D15&E15,'Impact Model'!\$D\$15:\$D\$340&'Impact Model'!\$E\$15:\$E\$340,0),5)}
Column H	Proposed Offset Actions	Define and Input brief detail of the action(s) (management intervention) proposed to Offset Impact. Further detail can be provided in supporting documentation.		
Column I	Offset area (ha)	Input the area (in hectares) over which the Offset activity related to this Biodiversity Attribute will be implemented. The same Offset activity, and therefore the same area over which the Offset activity is to be implemented, can apply to more than one Attribute.		
Column J	Confidence in Offset Actions	Estimate and input the likelihood that the proposed Offset Action (Column H) will be successful within the specified time estimate (Column O). This reflects that even with proven management techniques some uncertainty around outcomes is always present e.g. restoration plantings may fail due to unanticipated drought or pest pressures, or possum control targets may not be met due to bait interference by an unexpectedly high rat population. This confidence level does not include risk of default or failing to implement the proposed Offset Actions. Choose a confidence rating from the dropdown list, as follows: Low confidence: The proposed Offset Action uses methods that have either been successfully implemented in New Zealand or in the situation and context relevant to the Offset Site but infrequently, or the outcomes of the proposed Offset Action are not well proven or documented, or success rates elsewhere have been shown to be variable. Likelihood of success is > 50% but < 75%. Confident: The proposed Offset Action uses well known and often implemented methods which have been proven to succeed greater than 75% of the time although enough complicating factors and/or expert opinion exists to not have greater confidence in this Offset Action. Likelihood of success is greater than 75% but less than 90%. Very confident: The proposed Offset Action uses methods that are well tested and repeatedly proven to be very reliable for the situation and context relevant to the Offset Site; evidence-based expert opinion is that success is very likely. Likelihood of success is > 90%.	List validation: Low confidence > 50% <75%, Confident 75–90%, Very confident >90%	
Columns K & L	Time period over which to calculate NPBV	Decide whether to run calculations across five yearly time-steps for 35 years, or at a finite, user defined end point. The time-step calculation is limited to 35 years to reflect the maximum life of a resource consent. The finite end point is not time restricted. It is important to consider that management required to maintain the Offset over the long-term may be necessary beyond the time taken to demonstrate no net loss. Indicate preference using the drop-down list in Column K and follow the instructions in Column L.	List validation: Not calculated, Finite end point, Five yearly time-step	
Column M	Measure <u>prior to</u> Offset	Measure and input the value of the Biodiversity Attribute at the Offset Site prior to the proposed Offset Action being implemented, expressed in the Measurement Unit (Column F). The methods/models used to measure the Attribute at the Offset Site need to be identical to those used to measure the same Attribute at the Impact Site.	Cell contains Conditional Formatting to turn 'on' or 'off' dependent on choice made in Column K.	
Column N	Measure <u>after</u> the Offset	Estimate and input the value of the Biodiversity Attribute at the Offset Site following the proposed Offset Action at the finite end point — the time at which the Offset Action is anticipated to have achieved the stated objective (Column O), expressed in the Measurement Unit (Column F). Predictive models may be needed to inform this measure. Experts with expertise relevant to each Biodiversity Attribute may be able to estimate future measures. For the Model output to be meaningful, it is important that the attribute is responsive to management and this value is plausible.	Cell contains Conditional Formatting to turn 'on' or 'off' dependent on choice made in Column K.	
Column O	Time till end point (years)	Predict and input the anticipated number of years (from the time of implementing the Offset Action) until the Offset Action is expected to achieve the Offset goal.	Cell contains conditional Formatting to turn 'on' or 'off' dependent on choice made in Column K.	
Column P	Biodiversity Value at Offset Site	This is the difference between the future value of the Attribute after the Offset action (Column N) and the current value of the Attribute at the Offset Site prior to the Offset being implemented (Column M). This change in Attribute value is calculated as a proportion of the Benchmark (Column G). Any Attribute value greater than the Benchmark is truncated to 1. The proportional raw gain is adjusted to the level of confidence in the Offset Actions succeeding, by multiplying the raw gain by the midpoint of the confidence range (Column J). This calculation also incorporates the time preference discount rate (cell E11) and the time taken to reach the stated objective for the Offset Action (Column O). The gain in value is multiplied across the Offset Area (Column I) to give a final Attribute value.	Additional formula within this equation is used to instruct cell to return a message ('Not calculated') when this value has not been calculated. Confidence midpoints used to account for confidence are: Low confidence (>50% <75%) 62; Confident (75%–90%) 82.5; Very confident (>90%) 95.5. Midpoints are converted to proportions (0.62, 0.825, 0.955) for the calculation. Cell contains Conditional Formatting to turn 'on' or 'off' dependent on choice made in Column K.	=IF(K15="Finite end point",IFERROR(IF(ISBLANK(O15),"",IF(\$J15="Low confidence >50% <75%",(IF(N15<\$G15,N15/\$G15,1)-IF(M15<\$G15,M15/\$G15,1))*0.62,IF(\$J15="Confident 75-90%",(IF(N15<\$G15,N15/\$G15,1)-IF(M15<\$G15,M15/\$G15,1))*0.825,IF(\$J15="Very confident >90%",(IF(N15<\$G15,N15/\$G15,1)-IF(M15<\$G15,M15/\$G15,1))*0.955)))))/(1+\$E\$11)^O15)*(I15),"Not calculated"),"Not calculated")
Column Q	Biodiversity Value at Impact Site	This value is imported from the corresponding Impact Model and feeds into the Offset Model spreadsheet (Column R).	Contains an array formula to find matching information from the corresponding Impact Model and auto-populate this cell. NB: If cell is unprotected, use ctrl+shift+enter to move out of cell rather than just enter to avoid breaking the array formula. Cell contains Conditional Formatting to turn 'on' or 'off' dependent on choice made in Column K.	{=INDEX('Impact Model'!\$D\$15:\$N\$340,MATCH(D15&E15,'Impact Model'!\$D\$15:\$D\$340&'Impact Model'!\$E\$15:\$E\$340,0),9)}
Column R	Attribute Net Present Biodiversity Value	The Net Present Biodiversity Value (NPBV) is determined for each Attribute by calculating the difference between the Attribute biodiversity value at the Offset Site and at the Impact Site to give the net change in biodiversity value over time. A no net loss biodiversity exchange is demonstrated when this value is equal to or greater than zero. Negative values demonstrate a net loss, positive values demonstrate a net gain. Where the five yearly time-step option is chosen (Offset Model_5 yearly), this cell is populated with the Attribute NPBV value at the point that is equal or greater than zero or, when a equal or greater than zero NPBV is not reached, the NPBV at Year 35.	Additional formula within this equation is used to instruct cell to return a message ('Not calculated') when this value has not been calculated. If the User chooses to calculate the Attribute NPBV at five yearly time-steps, the equation imports this value from the Offset Model_5 yearly worksheet. This equation runs off named cell ranges (NPBV1.1a, NPBV1.1b etc. which are contained (and hidden) within the Offset Model_5 yearly worksheet (Columns V-AC). Values in this cell appear in red bold font when NPBV is less than zero.	=IF(K15="Choose option", "Not calculated",IF(K15="Finite end point",SUM(P15:Q15),IF(COUNTIF('Offset Model_5 yearly'!V15:AC15,">=0")<1,INDEX('Offset Model_5 yearly'!V15:AC15,1,COUNT('Offset Model_5 yearly'!V15:AC15)),INDEX('Offset Model_5 yearly'!V15:AC15,1,MATCH(TRUE,INDEX('Offset Model_5 yearly'!V15:AC15>=0,1,0))))))
Column T	Component Net Present Biodiversity Value	The NPBV for each component is calculated by averaging the NPBV of all the Attributes used to account for the Biodiversity Component (whether they were calculated using a finite end point or a five yearly time-step). All Biodiversity Attributes are equally weighted.	Adds up the rows which contain Attribute values and divides by the number of Attributes entered. Additional formula within this equation is used to instruct cell to return a message ('Not calculated') when this value has not been calculated. Cell contains Conditional Formatting to turn 'on' or 'off' dependent on choice made in Column K. Values in this cell appear in red bold font when the average NPBV is less than zero. **If more than five Attributes are to be accounted for the User will need to adjust calculation to capture additional Attribute rows. If less than five Attributes are to be averaged, no adjustment is required.	=IF(R15="Not calculated", "Not calculated",SUM(R15:R19)/ROUND(COUNTIF(R15:R19,">0")+COUNTIF(R15:R19,"<0"),0))

OFFSET MODEL

Key

User Input	Dropdown list
Auto-filled	Not Required

BIODIVERSITY TYPE	DISCOUNT RATE
0	#N/A
	0.01

READ ME:
Step 1: Biodiversity Attributes must be entered into the Impact Model prior to commencing input into the Offset Model.
Step 2: Input the Biodiversity Type identifier (e.g. 1 if it the first Biodiversity Type, 2, if it is the second etc.) into Cell B11. The same identifying number needs to be used for the same Biodiversity Type within the Impact and Offset Models. The Biodiversity Type (Cell C11) will be auto-populated.
Step 3: Input time preference Discount Rate (Cell E11)
Step 4: Biodiversity Components will be auto-populated once Cell B11 is populated.
Step 5: Biodiversity Attributes will be auto-populated once Cell B11 is populated.
Step 6: Work through accounting model for each Biodiversity Attribute entering values into light brown cells. At Column K choose method of accounting for time and follow instructions. If using a finite end point, continue on this sheet. If calculating the offset as accrued over time use the Offset Model_5 yearly worksheet.
Step 7: Repeat for additional Biodiversity Components (scrolling down the sheet)

This section captures which elements of biodiversity are to be accounted for, and the benchmark value for the Attribute. The information matches that in the Impact Model						These cells provide information about the proposed Offset Actions			Calculations can be made for a finite end point, or at five yearly time-steps over 35 years. Indicate preference in Column K and Follow the instructions in Column L		This section is where the marginal change in the measure of Biodiversity Attribute due to the Offset Action is quantified. Inputs are derived from direct measure, existing data or models where available, or expert estimated predictions. Attribute Biodiversity Value at the Offset Site is compared to the Attribute Biodiversity Value at the Impact Site to calculate the Net Present Biodiversity Value for each Attribute						This is the average Net Present Biodiversity Value for the Biodiversity Component
Biodiversity Component	Biodiversity Attribute		Measurement Unit	Benchmark	Proposed Offset Actions	Offset area (ha)	Confidence in Offset Actions				Measure prior to Offset	Measure after Offset	Time till endpoint (years)	Biodiversity Value at Offset Site	Biodiversity Value at Impact Site	Attribute Net Present Biodiversity Value	Component Net Present Biodiversity Value
0.1	Western tawa forest	0.1a	Native:Exotic	% native	100	Weeding, planting, pest animal control	5	Confident 75-90%	Finite end point	Continue to Column M	15	100	0	3.51	-2.80	0.70	1.62
		0.1b	Native species diversity	No.species	46	Weeding, planting, pest animal control	5	Very confident >90%	Finite end point	Continue to Column M	5	25	0	2.08	-1.06	1.02	
		0.1c	Canopy cover	%	80	Weeding, planting, pest animal control	5	Very confident >90%	Finite end point	Continue to Column M	2	80	0	4.66	-2.86	1.80	
		0.1d	Height to maturity (tawa)	metres	10	Weeding, planting, pest animal control	5	Confident 75-90%	Finite end point	Continue to Column M	0	10	5	3.92	-2.86	1.06	
		0.1e	Understorey	% native	70	Weeding, planting, pest animal control	5	Confident 75-90%	Finite end point	Continue to Column M	0	70	5	3.92	-0.41	3.52	

From: [Katie Huesser](#)
To: [Hayley Thomas](#); deichmann.britta@gmail.com
Cc: [Jaimee Cannon](#); [Tyler Sharratt \(Winstone Aggregates\)](#); [Ian Boothroyd](#)
Subject: External Sender: LU/0160/25 - Whitehall Quarry - Ecologist Review
Date: Wednesday, 18 February 2026 2:37:02 pm

CYBER SECURITY WARNING: This email is from an external source - be careful of attachments and links. Please follow the Cybersecurity Policy and report suspicious emails to Servicedesk

Hi Hayley and Britta,

Thanks for the discussion earlier today.

As discussed, Winstone could amend the application if these changes result in your assessment concluding that the ecological effects are no more than minor. The amendments would include:

- Including the kanuka as a measure of goodwill in the calculations and increasing the total planting to approximately 14ha.
- Using the 3% discount rate in the modelling.
- Legally protecting the proposed planting area.

I have summarised our response to each point in the table below:

Comment from Council ecologist	Winstone Response and key points of discussion
There is insufficient information to confirm whether occupied or previously occupied bat roost trees will be removed	We have conservatively assumed that bat roost trees will be removed, given extent of bat activity in the general area and that many of the mature trees have bat roost features, as the remaining SNAs do. Additional bat monitoring would not change this assumption or change the outcome. Instead of additional monitoring, Winstone proposes to invest in into the ecological outcome (pest management towards protective benefit of bats and other fauna within the wider landscape/context). The discussions with DOC and iwi acknowledged that there was bat roost habitat but it was better to focus efforts and costs on the protective benefit / pest management. Tree felling will occur in accordance with DOC bat protocols.
Inclusion of the kanuka scrub in the calculations	Removal of the kanuka scrub is a permitted activity and does not form part of the application. Winstone as a measure of good will and acknowledging that kanuka may include bat roost trees agreed to include the kanuka in the calculations. This will increase the proposed new planting from 12.5ha approximately 14ha.
The recalculated outputs for the modelling and amendment to reflect	Spreadsheet provided (17/02/2026) showing the calculations.

structural attributes of the mature tawa forest being removed	
Use of the standard 3% discount rate	The 1% discount rate was used because the new planting will (in 15 years time) provide suitable habitat for bats (e.g. foraging). The offset is for loss of functioning forest rather than bat roosts, noting that overall compensation provided for loss of bat roosts (including pest management prior to vegetation clearance). Winstone agreed to use the 3% discount rate.
Provision for artificial bat roost installation and long-term bat monitoring	This was initially considered as part of the proposal however artificial bat roosts were not supported by DOC or Iwi, due to wider context providing bat habitat. Instead, their preference was to focus efforts on intensive pest management before vegetation clearance (and ongoing pest management) which provides a better ecological outcome. DOC initial feedback was that artificial roosts in this area would not be effective because there is a large forest area of SNAs surrounding the site that provides suitable natural habitat for roosting (beyond those being lost).
Provision for financial compensation for bat roost habitat where removal is unavoidable	The court case referenced was a decision made for that particular application and context and does not set a precedent for all other applications. The comprehensive offsetting and compensation package includes compensation for loss of bat roost habitat in the form of comprehensive pest management. Winstone already has a positive biodiversity programme at Maungakawa Reserve and are working with Ngāti Hauā. Positive Biodiversity Winstone Aggregates
Agreement to the permanent legal protection of the remaining SNA and enhancement areas	Winstone agreed to legal protection of the proposed planting area. It is also noted that there are cultural covenants to the west which restricts further expansion. The SNAs already have sufficient protection in the District Plan which means additional legal protection with covenants is not necessary. Tyler will discuss this with Management Team again. This quarry expansion application provides for 60 years of resource, and any further expansion beyond the expansion footprint would require additional resource consents.
Further information/assessment regarding time lags and cumulative effects to understand whether no net	The time lags are inbuilt into the biodiversity model (which includes pest management for the protective benefit of the bat population), which is common ecological practice/ standard model globally. This is

loss is realistically achieved, particularly in the short to medium term

why more planting than what is lost is proposed.

- The comprehensive offsetting and compensation package includes compensation for loss of bat roost habitat in the form of comprehensive pest management (in response to DOC and Iwi feedback).
- The proposed ecological offset and compensation package has been developed in consultation with Iwi and DOC who are generally supportive of the approach, including for bat management.
- It is not pragmatic to expect planting to occur in advance of all of the tree removal (especially for the northern SNA where access to aggregate resource is necessary in the short term). The proposal maintains indigenous biodiversity values and achieves a no net loss, based on the findings of the biodiversity model and the ecological assessment.

Britta if you could take some time to consider this response and reassess the effects and come back to us in the next couple of days.

Please let us know if you require anything further.

Cheers,

Katie

Katie Huesser | Planner | Associate Principal

E: katie.huesser@boffamiskell.co.nz | D: +64 7 960 4216 | LEVEL 3, C BLOCK (MADE) | 401 GREY STREET | HAMILTON EAST 3216 | NEW ZEALAND

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From: [Hayley Thomas](#)
To: [Katie Huesser](#); deichmann.britta@gmail.com
Cc: [Jaimee Cannon](#); [Tyler Sharratt \(Winstone Aggregates\)](#); [Ian Boothroyd](#)
Subject: RE: External Sender: LU/0160/25 - Whitehall Quarry - Ecologist Review
Date: Friday, 20 February 2026 11:24:00 am

Morning Katie,

I've had a chance to talk through things with Britta this morning. It would be of assistance if you could provide the following:

- Any further written advice from DOC about the bat management and contact details for those in DOC who provided the advice (Was it Andrew Styche Email: astyche@doc.govt.nz and Tertia Thurley tthurley@doc.govt.nz?). Britta would like to just talk things through with them to understand the advice they have provided.
- Further consideration of the inclusion of artificial bat roosts and bat monitoring. While the comments to date have noted that the focus is on pest management and that bats will likely use existing trees instead of artificial roosts, the artificial roosts provide an immediate roosting alternative prior to the new vegetation providing roosting options. In terms of monitoring, this is a mechanism to understand how the bat population is affected by the removal of the SNA area and a tool to understand how effective the pest management is so it would be appreciated if this could be considered further by the Winstone Team.
- An update to proposed management plan to reference the bat protocols which were updated in 2024.

Thanks in advance,

Hayley

.....
Hayley Thomas Project Planner **WAIPĀ DISTRICT COUNCIL**
Hayley.Thomas@waipadc.govt.nz | www.waipadc.govt.nz
PH: 0800 WAIPADC (0800 924 723) | **DDI:** 07 823 3811

From: [Katie Huesser](#)
To: [Hayley Thomas](#); deichmann.britta@gmail.com
Cc: [Jaimee Cannon](#); [Tyler Sharratt \(Winstone Aggregates\)](#); [Ian Boothroyd](#)
Subject: RE: External Sender: LU/0160/25 - Whitehall Quarry - Ecologist Review
Date: Friday, 20 February 2026 2:23:57 pm
Attachments: [Feedback - WRC - ICM Coromandel Comprehensive Maintenance Consent PAWP - DOC-7464346.pdf](#)

Hi Hayley,

See attached advice received from Ander Styche (DOC) on bats. His contact details are below if Britta would like to discuss with him further.

Andrew Styche

Senior Ranger, Community
Department of Conservation, Waikato District
Phone 027 536 6907
astyche@doc.govt.nz

We will get back to you on the other matters asap.

Cheers,

Katie

28/03/2025

Ian Boothroyd
Boffa Miskell
Level 3
82 Wyndham Street
AUCKLAND 1010

DEPARTMENT OF CONSERVATION COMMENTS ON THE WHITEHALL QUARRY EXPANSION MITIGATION PLAN

Background

Below are comments on the Whitehall Quarry Expansion Mitigation Plan received 13 January 2025.

Specific comments

Page #	Section	Comment
1-2	Table 1	The actions recorded in the Offset row do not meet the standards for offsetting. These are more appropriately categorised as compensation. For the offsetting guidelines see Guidance on biodiversity offsetting in New Zealand: Policies and plans.
3	Herpetofauna	You may have heard about the latest High Court decision regarding DOCs ability to authorise killing of protected wildlife. In effect, DOC can't issue an authorisation to kill protected wildlife because that contravenes the purpose of the Act. Therefore, any killing would be an offense, with a potential for prosecution. It appears, from what you say, that the risk of killing native lizards during the quarry expansion is low, though not zero. How DOC addresses this issue is yet to be determined and will be impacted by Government moves to rewrite the Wildlife Act. How it has been addressed in the past is by the party carrying out the activity following best practice methods to avoid or minimise harm or killing. What this has looked like in the past is a requirement for salvage. DOC has been allowing salvaged lizards to be dumped in any nearby habitat; however, evidence coming from research suggests this provides no positive outcome for the salvaged lizards. Therefore, we [in the Waikato] are now requiring salvaged lizards to be transferred to a predator free enclosure.

		Predator free means free of rodents, including mice, and hedgehogs. Some of the cells on Maungatautari meet this requirement. Any lizards transferred to Maungatautari need to first go through quarantine. This service is offered by Otorohanga Kiwi House and Hamilton Zoo on a cost-recovery basis. I recommend you create a plan for what you will do if you make an incidental discovery [and recovery] of a native lizard and seek an authorisation to undertake this activity. The reliance on destructive searches for the pre-clearance action is OK based on the numbers you have located to date. This needs confirmation from my technical advisor colleagues who deal effects on native with lizards through the RMA process.
4	Avifauna	Native birds are going to be impacted by the works you will be carrying out. Many native birds are territorial, and most rely on building nests in trees for breeding. The intention to remove trees will therefore have an impact on these birds. As for lizards, you can not be authorised to kill any native birds, which includes their nests and eggs. You will have to take effective steps to avoid killing or disturbing. The actions you have provided indicate you have considered appropriate steps to achieve this. The proposed mitigation should replace the lost habitat over time, which is good, but the Wildlife Act does not recognise this. Predator control being done to protect bats should also benefit birds, contributing to the protective benefit from this activity.
5	Pest management	The 'Protocols for minimising the risk of felling occupied bat roosts 2024' is accepted as the best practice method for avoiding killing bats and therefore meets the requirements of the Wildlife Act. However, removing roost trees means bats are forced into fewer and riskier sites. Just planting trees does not manage this effect because the benefit will not occur for many decades, well after the effect has occurred. Meaningful predator control is required to protect bats that are using the remaining roosts. Preferably, main predators, such as ship rats, should be suppressed throughout the year for the duration of the consent. I would like you to set targets that are required to be achieved to demonstrate effectiveness, i.e., number on an index that you intend to achieve to show pest control has been successful. For example, maintain rats at or below 5% tracking tunnel index annually. The equivalent for possums would be to maintain possums at or below a 5% residual trap catch. A focus on ship rats is the priority. Possums will need to be controlled to make rat control easier and effective, plus possums can prey on bats. Stoats and cats are predators of bats but are harder to monitor and even harder to control at the scale you are working. I don't think I could fairly hold you to a measure of success for their control on the quarry site.

		Fencing to exclude deer is probably the only way to manage their effects on the SNAs and mitigation planting and is supported.
--	--	--

General comments

The plan does not clearly show what amounts of different habitat/ecosystem types are being lost. Consequently, it is difficult to judge whether the proposed avoidance, mitigation or compensation (you've called it offset, but it isn't) is sufficient. The plan would benefit from clearly describing the amount and characteristics of the habitat/ecosystems being lost and what each is being replaced with, whether equivalent recreated habitat/ecosystem, predator control, or some other action.

Yours sincerely



Andrew Styche, Senior Ranger – Community, Waikato District

From: [Katie Huesser](#)
To: [Hayley Thomas](#); deichmann.britta@gmail.com
Cc: [Jaimee Cannon](#); [Tyler Sharratt \(Winstone Aggregates\)](#); [Ian Boothroyd](#)
Subject: RE: External Sender: LU/0160/25 - Whitehall Quarry - Ecologist Review
Date: Friday, 20 February 2026 2:33:14 pm
Attachments: [WHITEHALL QUARRY Letter response DOC 20250711 FINAL.pdf](#)

Hi Hayley,

Our response to DOC is also attached. These were included in Appendix 13 of the application. Further details on the consultation are in Section 15 of the AEE.

Cheers,

Katie

11 July 2025

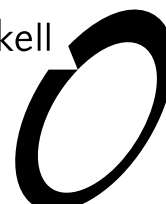
Andrew Styche
Department of Conservation
Waikato District

E-mail: astyche@doc.govt.nz

Our reference: BM190311A

Dear Andrew

Boffa Miskell



WHITEHALL QUARRY EXPANSION MITIGATION PLAN

Thank you for your letter dated 28 March 2025, with your comments regarding the proposed mitigation for the proposed Whitehall Quarry expansion. Below we outline how we have responded to your specific comments in our revised mitigation plan.

We note that we are aware of the Government response to the recent High Court decision you refer to in your correspondence. The Government response does not alter our mitigation and serves to strengthen the actions we have proposed to prevent or minimise the disturbance to populations of indigenous fauna, notably the long-tailed bat population.

Specific comments

We have set out our response to your comments in the same table set up as provided.

Page	Item	Response
Page 1-2	Table 1	We have revised Table 1 and have re-classified the predator control as compensation.
3	Herpetofauna	We are aware of the Government response to the recent High Court decision. The existing Quarry Management Plan (QMP) includes a requirement where <i>'Pest animal control will be carried out within relocation areas where salvaged lizards are to be released. This should be in place prior to relocation and ongoing pest animal control carried out after relocation.'</i> The QMP provides for destructive searches alongside the provision for salvage and relocation. We have followed accepted practice to minimise impacts on herpetofauna. Any disturbance or killing will be incidental to these measures.
4	Avifauna	Effects management remains to: Avoid disturbance during bird breeding season. Application of nest checks as part of tree felling protocols if occurring during breeding season. We consider that these are effective steps to avoid killing or disturbing birds. Any disturbance or killing will be incidental to these measures.
5	Pest management	We have prepared a Draft Pest Management Plan (PMP) with a focus on the protection and supporting the resilience of the long-tailed bat

population; and thus, protect other indigenous fauna within the vegetation. The pest management will be applied to the existing SNAs within the boundaries of Whitehall Quarry, and also to the planted enhancement area. We note that, at this stage, the PMP is subject to change as the application progresses through consultation and regulatory process.

We have provided a focus on ship rats, but the pest management extends to mustelids, mice, cats, possums, pigs, deer and includes wasps.

We have recommended indicative targets within the PMP as follows:

Pest Species	Management Target	Threshold	Monitoring frequency
Rats	<5% CCI (year-round)	≥10% CCI (year-round)	CCI – x3 checks per annum in May, August & December
Mice	<5% CCI (year-round)	≥10% CCI (year-round)	
Possums	<5% CCI	≥10% CCI	
Mustelids	5 detections per 2000 CH ¹	>10 detections per 2000 CH ¹	Ongoing monitoring via paired trail cameras.
Feral Cats ²	5 detections per 2000 CH ¹	>10 detections per 2000 CH ¹	
Wild Pigs	Zero detections per 2000 CH (Initial elimination, then zero ongoing detections in the fenced areas)	≥1 wild pig detected at any given time	Any observation/sign initiate response
Feral Goats and Deer	0% Density. (Initial elimination, then zero ongoing detections in the fenced areas)	0% Density	Any observation/sign initiate response
Wasps (Vespula sp.)	≥80% reduction in wasp nest flight counts.	<80% reduction in wasp nest flight counts.	Once per annum in summer using wasp nest flight counts

¹ These numbers are based on the draft DOC best-practice guidelines for targets and thresholds for mustelids and feral cats using camera trap indices. The completion of the new DOC best practice guidelines is still in progress.

² Cat targets and thresholds must represent at least 2 different individual feral cats (if distinguishable by markings).

The Draft Pest Management Plan goes on to recommend actions where these targets are not achieved.

Concluding comments

We hope that our response to your helpful comments is acceptable. We remain open to a continuous discussion on the matter of mitigation for the effects of the proposed expansion at Whitehall Quarry.

We are currently finalising the resource consent applications for lodgement with Waipa District Council and Waikato Regional Council. In addition, we are preparing a Wildlife Permit Application which we expect to submit with DOC for processing later in July 2025.

Yours sincerely

BOFFA MISKELL LTD

A handwritten signature in black ink, reading 'I. Boothroyd', written in a cursive style.

Ian Boothroyd

Senior Principal Ecologist

From: [Britta Deichmann](#)
To: [Hayley Thomas](#)
Cc: [Katie Huesser](#); [Jaimee Cannon](#); [Tyler Sharratt \(Winstone Aggregates\)](#); [Ian Boothroyd](#)
Subject: Re: External Sender: LU/0160/25 - Whitehall Quarry - Ecologist Review
Date: Wednesday, 25 February 2026 2:19:25 pm

Hi everyone,

Sorry for the slow response and thank you for forwarding the correspondence with DOC. I've tried to contact Andrew Styche by phone and email but have not yet been able to speak with him. I would ideally like to see the written opinion on the bat related impacts of this application by one of the DOC bat experts, such as Dr Borkin or Ms Pryde, as well.

In the meantime, I have discussed the proposed vegetation clearance and associated reduction in SNA extent with three independent bat experts, specifically in relation to the loss of roost trees and the resulting reduction in carrying capacity of the remaining habitat on site.

While you mentioned that Andrew Styche has indicated that artificial roosts may not be effective given the wider context of the site and several other SNAs providing natural roosting opportunities, the consistent view from my discussions with the independent bat experts was that animal pest control alone will be insufficient to address the ecological effects of roost tree removal. While pest control may improve survival rates, it doesn't compensate for the immediate loss of cavity-bearing trees, particularly maternity roosts.

Therefore, while the proposed planting and animal pest control will provide ecological benefits for the site, over the long-term, it will not necessarily provide benefits for bats if they are no longer able to roost within the habitat removed until the structure features of the plantings achieve functional roosting habitat. The restoration plantings will take decades before cavity-forming structures develop. In the interim, the reduction in SNA extent will decrease roost availability, reduce carrying capacity and potentially weaken the resilience of the existing bat population by reducing the availability of the roost-switching network.

I therefore think that artificial bat roosts should be installed (and maintained for a period of at least ten years) within the remaining SNAs on site should as part of the mitigation package to address the temporal gap between habitat loss and future cavity formation. I realise that the artificial roosts are supplementary only and don't represent a like-for-like replacement for mature forest structure. For that reason, pest control and the proposed relocation of roost trees (as outlined in the Bat Management Plan) remain important components of the mitigation response.

In terms of the magnitude of effects, this will depend largely on the functional importance of the roost trees proposed for removal. If confirmed maternity roost trees are affected, the resulting effects could be considered more than minor. While long-tailed bats frequently switch roosts, they do so within established networks of suitable cavity trees. If equivalent maternity roost trees are not available within the retained SNAs, the removal of even a single maternity roost may have disproportionately significant ecological consequences due to its role in supporting reproductive success.

It would therefore be helpful to clarify:

- whether multiple equivalent maternity roost trees are present within the retained SNAs; and
- whether the trees proposed for removal are peripheral or core components of the maternity roost network.

In relation to monitoring, if pest control is relied upon as a key mitigation measure, a monitoring programme will be necessary to demonstrate that the resident bat population and its reproductive capacity are being maintained over time.

Regarding legal protection of the remaining SNA areas, I understand the constraints associated with the northern remnant being located within the Significant Mineral Extraction Zone. However, the western

remnant lies outside that zone and, in my view, should be formally protected. The suggestion that the District Plan provides sufficient protection is open to interpretation, particularly given that the current application proposes the removal of identified SNAs.

I look forward to discussing this further.

Cheers,

Britta Deichmann

Director / Senior Ecologist

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Ph: 021 088 111 27

From: [Jaimee Cannon](#)
To: [Britta Deichmann](#); [Hayley Thomas](#)
Cc: [Katie Huesser](#); [Tyler Sharratt \(Winstone Aggregates\)](#); [Ian Boothroyd](#); [Andrew Blayney](#)
Subject: External Sender: RE: LU/0160/25 - Whitehall Quarry - Ecologist Review - Memo for Bat Roost Mitigation
Date: Monday, 23 March 2026 4:20:06 pm
Attachments: [Whitehall Quarry Bat Roost Mitigation_Final_20260323.pdf](#)
Importance: High

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Hi Britta

Thanks for your patience. We have worked through your suggestions and provided a memorandum (attached) that proposes installation of bat boxes, along with the increase in planting area to 14 hectares, and legal protection of the proposed planting area as previously discussed in our meeting and recorded below. Please can you review and let us know your thoughts.

We would be happy to meet to discuss further as required.

Thanks
Jaimee



Memorandum

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Attention: Tyler Sharratt

Company: Winstone Aggregates

Date: 23 March 2026

From: Ian Boothroyd (Partner, Ecologist), Andrew Blayney (Senior Principal, Ecologist)

Message Ref: Whitehall Quarry Bat Management – Response to Waipa District Council

Project No: BM019311.01

Introduction

This memo presents a response to queries and suggestions made by Waipa District Council and their ecology review regarding the loss of bat habitat at Whitehall Quarry.

Bat Roosts

WDC have raised the suggestion that artificial bat roosts should be installed (and maintained for a period of at least ten years) within the remaining SNAs on site as part of the mitigation package to address the temporal gap between habitat loss and future cavity formation.

Context

Winstone has applied the effects management hierarchy to the proposal (with our emphasis on the measures proposed for bats) as summarised below:

- **Avoidance:** Winstone is unable to avoid removal of native vegetation at Whitehall Quarry due to the constrained location of the aggregate resource. There is a functional need to continue quarrying at Whitehall Quarry, with no practical alternatives (as explained in Section 9.0 of the application), therefore the loss of indigenous and exotic vegetation is unavoidable.
- **Minimise:** Winstone has limited the total area of SNA clearance to 5.46 ha to minimise the loss of vegetation as much as possible (to 11.7% of the SNA areas), and to retain 88% of the SNA areas. To further minimise disturbance, Winstone is also proposing to:
 - o Stage the long-term expansion so the loss of vegetation as part of Stage 1 is limited to 2.6 ha (in SNA WP527) meaning the vegetation in SNA WP530 will remain in-situ until approximately 2041¹
 - o Timing of vegetation clearance to minimise disturbance during bat maternity season (October to February) and bird breeding season (primarily August – March), or if works are required to occur during bird breeding season, undertaking nest checks prior to clearance.

¹ Approximate timing, subject to demand for aggregates

- o Tree felling protocols for the removal of potential roost trees for long-tailed bats in accordance with a Bat Management Plan², which involves:
 - Marking trees with potential roost features.
 - Felling potential roost trees is carried out between 1 October and 30 April.
 - Checking for absence of bat activity prior to tree felling.
 - Tree inspections by a competent bat worker and experienced tree- climber (e.g. an arborist) working with an approved bat expert to determine the presence/absence of bats.
 - Avoiding felling and disturbance of trees where bat presence has been confirmed until the bats naturally vacate the roost/s.
 - Removing the tree and relocating the roost feature if practicable and safe to do so.
- **Offset:** planting an area of approximately 14 ha with native vegetation with long-term provision for habitat for fauna species, including an appropriate mix of plant species to maximise roost and foraging potential to offset the loss of 5.68 ha of indigenous vegetation and 0.22 ha of kanuka scrub, to be fenced and cleared of stock, occur as soon as possible on the western slopes of the hill west of the quarry expansion (in accordance with the Proposed Planting Plan). The planted areas and connected SNAs will create approximately 86 ha of contiguous native vegetation providing enhanced habitat for native fauna.
- **Compensation:** comprehensive pest animal and plant management programme for the replanting area and remaining SNAs to enable successful rehabilitation and for the protective benefit of indigenous fauna (especially long-tailed bats). Ongoing pest management throughout the Whitehall Quarry property SNAs and enhancement planting area aims to further protect residual bat populations and support long term bat breeding and recruitment.
- It is noted that the forest edge of mature indigenous vegetation (as currently occurs) will be retained at the quarry margin, although relocated in each of the SNAs. Accordingly, the quarry margin will be similar in structure to as it occurs now. The forest/quarry edge continues to form a movement and foraging corridor for bats.

Artificial bat roots (bat boxes)

In response to the feedback from WDC, we have re-considered the provision of bat boxes and proposed an approach as part of the mitigation package.

Rather than installing bat boxes directly onto live trees (where banding failure can rapidly occur as trees grow), it is proposed that artificial roosting poles be installed. These poles provide a stable, long-term structure, can support multiple boxes per pole, and avoid impacts on existing vegetation.

Winstone Aggregates has agreed to provide up to 20 artificial roosting poles, with four bat boxes installed per pole, resulting in a total of 80 bat boxes over the life of the project. The poles and boxes will be installed progressively in alignment with vegetation clearance stages, such that:

- Stage 1: 10 poles (40 bat boxes) installed prior to Stage 1 SNA WP527.
- Stage 2: 10 additional poles (40 bat boxes) installed prior to clearance SNA WP530.

Pole and roost design, indicative locations and final installation details for the artificial roosting poles (including orientation, height, and micro-siting) will be confirmed by a suitably qualified bat ecologist and

² Prepared by Boffa Miskell, dated 22 December 2025

provided to Council within six months of consent being granted, or prior to vegetation clearance for the relevant stage, whichever is sooner. Bat boxes will be installed prior to vegetation clearance occurring.

Given that artificial roosts mounted on poles are less susceptible to movement, damage, or tree growth effects, any monitoring will focus on confirming installation, maintenance and general condition of the poles and boxes.

Proposed consent conditions are provided below.

Installation of artificial bat roosts

1. *The consent holder shall install artificial bat roosting poles and bat boxes. The poles and bat boxes shall be installed in the following stages:*
 - *Stage 1: 10 poles (40 bat boxes) installed prior to Stage 1 SNA WP527.*
 - *Stage 2: 10 poles (40 bat boxes) installed prior to clearance of SNA WP530.*
2. *Within six months of resource consent being granted, or prior to vegetation clearance for the relevant stage (whichever is sooner), the consent holder shall provide Waipā District Council with details of:*
 - *The design of the artificial roost poles and boxes;*
 - *the number of roosting poles and bat boxes to be installed for that stage;*
 - *the proposed locations, orientation and heights of the poles; and*
 - *confirmation that installation has been undertaken or is scheduled prior to clearance.*

Post-installation monitoring and maintenance of artificial bat roosts

3. *The consent holder shall undertake post-installation monitoring and maintenance of the artificial bat roosting poles and bat boxes as follows:*
 - *a condition and occupancy check shall be undertaken annually for twenty years following installation of each stage of roosting poles;*
 - *monitoring shall be undertaken by a suitably qualified ecologist with experience in bat ecology.*

Monitoring shall be limited to:

 - *confirming the continued presence and structural integrity of poles and boxes.*
 - *identifying evidence of bat use where externally observable.*
 - *recording any maintenance issues.*
4. *Maintenance issues identified in the monitoring should be rectified as soon as practicable after monitoring.*
5. *Details of monitoring shall be recorded in a brief monitoring report and provided to Council.*

Pest control

Comprehensive pest control is proposed at Whitehall Quarry, and forms one of the compensation mechanisms offered to manage the potential effects on long-tail bats. Encompassing, but not exclusive to, the loss of potential cavity-bearing trees, particularly maternity roosts. The proposed pest management was not directed solely at the immediate loss of maternity roost, but to provide improved survival of bats throughout the retained SNA areas and offset planting areas.

Conclusions

The proposal follows the effects management hierarchy as set out above, we have proposed the addition of artificial bat roost boxes to compliment the pest control proposal to compensate for the impacts on long-tailed bats and their habitats. This will compensate for the lag time between roost loss and roost replacement.

From: [Britta Deichmann](#)
To: [Jaimee Cannon](#)
Cc: [Hayley Thomas](#); [Katie Huesser](#); [Tyler Sharratt \(Winstone Aggregates\)](#); [Ian Boothroyd](#); [Andrew Blayney](#)
Subject: External Sender: Re: LU/0160/25 - Whitehall Quarry - Ecologist Review - Memo for Bat Roost Mitigation
Date: Wednesday, 25 March 2026 1:17:49 pm

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Hi Jamie,

Thank you for sending this through and for working through the suggestions.

I appreciate the inclusion of artificial roosts and the increase in planting area to 14 ha, along with the intention to legally protect the planting area.

I do have a couple of remaining comments though.

1) The proposed monitoring of the bat boxes appears to be limited to checking the condition of the poles and boxes and noting any externally observable evidence of use. Given that the artificial roosts and animal pest control are intended to help address the loss of cavity trees, it would be helpful if monitoring could also include some form of assessment of bat use of the boxes and the resident bat population where practicable (e.g. emergence observations or periodic acoustic monitoring), so that the effectiveness of the mitigation measures can be evaluated over time.

2) As mentioned previously, I still consider that the remaining western SNA should be formally protected, given that it sits outside the Significant Mineral Extraction Zone.

Otherwise, the additional mitigation measures are moving things in the right direction.

Cheers,

Britta Deichmann
Director / Senior Ecologist

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From: [Andrew Blayney](#)
To: [Britta Deichmann](#); [Jaimee Cannon](#)
Cc: [Hayley Thomas](#); [Katie Huesser](#); [Tyler Sharratt \(Winstone Aggregates\)](#); [Ian Boothroyd](#)
Subject: External Sender: RE: LU/0160/25 - Whitehall Quarry - Ecologist Review - Memo for Bat Roost Mitigation
Date: Wednesday, 25 March 2026 4:11:17 pm

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Hi Britta,

In terms of item 1 my advice is that occupancy monitoring of the artificial roost boxes and bioacoustic monitoring is not going to be effective in this context. This is primarily because I'm cautious about recommending monitoring where I don't think it will meaningfully inform us about impacts or the effectiveness of management.

Bat activity detected through bioacoustic monitoring is highly variable, and detecting any real increase or decline in activity only tends to be possible where the sample size is large and the effect size is also large. Even then, it's usually impossible to confidently link that change to the project or the mitigation measures. Long-tailed bats move over wide areas, and small changes in the surrounding landscape can significantly alter movement or usage patterns independent of specific effects or management activities.

Bat activity is also not a good proxy for management success or impact. Activity can increase for reasons that are negative (e.g. habitat loss concentrating movement) or decrease for reasons outside the project's influence. We routinely temper people's interpretation of survey results for this reason, and the same caution applies when considering monitoring as a way of evaluating effects management.

So even if monitoring did detect a genuine decline after accounting for natural variability, there would be no certainty about whether this represented a problem, nor any ability to identify the cause without also investigating unrelated landscape changes.

We also have to be clear around the required actions in the event the monitoring detects the effect that will have been consented and the effects management strategy is intended to manage. Based on the current proposed approach of offset with planting and roost boxes there is an anticipated lag phase and discount applied to account for this. We would therefore need to, assume bat activity is directly correlated to effect and efficacy of management, determine the effect size the monitoring must be able to detect, thus informing the required sample size and statistical power, the expected impact on bat activity of the consented activity, the expected increase in bat activity over time in response to the effects management and what deviation from this expectation is considered indicative of failure (or success beyond that anticipated).

Because of this, my advice has been to focus on implementing effects-management measures rather than attempting to measure their efficacy through acoustic data that is not likely to provide that clarity.

There's also the question of how one would respond to monitoring results. With a quarry, reversing the core effect isn't an option, and within the land the applicant controls they already appear to be proposing the actions I would normally suggest for improving bat habitat.

In terms of bat boxes, given the expected low occupancy rates of artificial roost boxes, monitoring is likely to involve a lot of cost, and finding nothing. However, I don't consider this indicative of failure. Roosts that are used by bats are naturally rare in the landscape, and we tend to unfairly expect artificial roosts to perform differently. It is often cited that bats take several years to begin using artificial boxes and that only a few boxes are ever used, as if this reflects poor efficacy. I take the opposite view: the timeframe to occupancy is shorter, and the overall occupancy rate is higher than what you would achieve through tree planting, and certainly more frequent than you would detect across the same number of potential natural roost features. Artificial roost boxes therefore play a role in bridging the time lag between natural roost loss and natural roost creation. Slightly unrelated but criticism of them I think is a bit unfair in the ecological context they are used.

Because of this, I think the focus should be on keeping the boxes in good condition and noting any external indications of use, rather than undertaking active surveys. If boxes become frequently used, visible evidence of this will emerge naturally, and I don't think targeted surveys would provide much more insight than this.

I'm happy to assist with conditions around the maintenance and checking of bat roost boxes etc. to ensure the data that will be collected is used effectively. Equally in terms of bioacoustic monitoring I'm happy to discuss this.

Regards,

Andrew Blayney | Ecologist | Senior Principal | Certified Environmental Practitioner

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From: [Britta Deichmann](#)
To: [Andrew Blayney](#)
Cc: [Jaimee Cannon](#); [Hayley Thomas](#); [Katie Huesser](#); [Tyler Sharratt \(Winstone Aggregates\)](#); [Ian Boothroyd](#)
Subject: External Sender: Re: LU/0160/25 - Whitehall Quarry - Ecologist Review - Memo for Bat Roost Mitigation
Date: Friday, 27 March 2026 10:47:23 am

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Hi Andrew,

Thanks for your helpful email. I completely take your point about the limitations of acoustic monitoring in this context.

I suspect my earlier email wasn't worded very clearly. My thinking wasn't that we need to demonstrate statistically robust changes in bat activity or population trends, but rather that we should have some indication that the mitigation package (roost boxes and predator control) is functioning as intended, given that it's being relied upon to mitigate the loss of old-growth forest with cavity trees.

I agree that acoustic monitoring data needs to be interpreted cautiously. My thinking was more along the lines of periodic surveys providing contextual information over time. Perhaps a baseline acoustic survey before works start, followed by repeat surveys every 3 years, alongside the artificial roost box checks and the animal pest monitoring that is already proposed. Would something along those lines help flag any unexpected outcomes so the mitigation approach could be adjusted if needed? Or do you consider the monitoring currently proposed in the Pest Management Operations Plan to be sufficient to demonstrate that the predator control measures are achieving the intended benefit for bats?

If acoustic monitoring isn't likely to be helpful in this case, I'm very happy to discuss what level or type of monitoring you think would be appropriate and worthwhile here.

Thanks as well for the offer to help with conditions around maintaining and checking the roost boxes. That would be really useful.

Cheers,

Britta Deichmann
Director / Senior Ecologist

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415 Te Papatapu Road
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Ph: 021 088 111 27

From: [Andrew Blayney](#)
To: [Britta Deichmann](#)
Cc: [Jaimee Cannon](#); [Hayley Thomas](#); [Katie Huesser](#); [Tyler Sharratt \(Winstone Aggregates\)](#); [Ian Boothroyd](#)
Subject: External Sender: RE: LU/0160/25 - Whitehall Quarry - Ecologist Review - Memo for Bat Roost Mitigation
Date: Friday, 27 March 2026 11:24:26 am

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Hi Britta,

I think acoustic monitoring would fall in the category of interesting but not strictly useful. I'm not opposed to monitoring but even a baseline/3 yearly regime wouldn't have the power to determine trends. I also note that baseline for establishing efficacy of effects management needs to occur after the effect (works start) to be an accurate reflection of the efficacy of effects management.

I think predator monitoring as a proxy for efficacy will likely be a far better proxy and this data can be responded to adaptively to ensure pest levels are maintained at appropriate levels.

If bioacoustic monitoring was to be conditioned I do not think it could be used in an adaptive management context as it's too variable with too many limitations. It could be used as an interesting data point to refer to in the process with caveats around the limitations and variability. As mentioned previously happy to assist with drafting a condition that might work in this context.

Regards,

Andrew Blayney | Ecologist | Senior Principal | Certified Environmental Practitioner

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From: [Britta Deichmann](#)
To: [Jaimee Cannon](#)
Cc: [Hayley Thomas](#); [Katie Huesser](#); [Tyler Sharratt \(Winstone Aggregates\)](#); [Andrew Blayney](#); [Quentin Budd](#); [Ian Boothroyd](#)
Subject: External Sender: Re: Whitehall Quarry - request for update
Date: Wednesday, 15 April 2026 3:15:34 pm

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Hi everyone,

Thank you for your patience while I have waited for input from Tertia Thurley from DOC. I will forward her email shortly.

Having reconsidered the extent of indigenous vegetation clearance, the ecological values present, and the proposed mitigation and offsetting measures, my overall conclusion is as follows.

The key issue remains the removal of approximately 5.46 ha of mature tawa-dominant forest and 1.9 ha of kanuka scrub. The tawa forest in particular is of very high ecological value given the high levels of long-tailed bat activity recorded across the site and the presence of multiple roost trees, particularly within the western remnant, including potential maternity roosts. As noted by Tertia, such roosting habitat is not readily replaceable, as the specific thermal properties required are difficult to replicate. These roost structures will take many decades to re-establish and are especially valuable given the relative scarcity of mature forest within the wider Waipa District.

While I acknowledge the proposed mitigation measures (including weed and animal pest control on the Winstone property, planting and legal protection of a 14 ha restoration area, and installation of artificial bat roosts), and consider that they are likely to address the loss of vegetation values in the long term, there remains a high degree of uncertainty as to whether these measures will adequately address the loss of bat roosting habitat. In particular:

- Restoration planting will take several decades before it can provide any comparable roosting function, and even then may not replicate the thermal properties required for successful breeding of long-tailed bats.
- The installation of artificial bat roosts is a positive addition to the mitigation package; however, their ability to compensate for the loss of natural roost sites is uncertain, as they are unlikely to fully replicate the thermal and structural qualities of natural roosts.
- Animal pest control is limited to the Winstone property and does not align with the full roosting range of the resident bat population, thereby limiting its likely benefit.

On this basis, it is my opinion that residual adverse effects on long-tailed bats, associated with the loss of mature forest habitat (including multiple roost trees), will remain after the proposed mitigation measures are taken into account. Accordingly, I consider that the ecological effects of the proposed quarry extension on long-tailed bats are likely to be more than minor, even with the proposed mitigation measures in place.

In light of this conclusion, any effects management framework would need to move beyond mitigation alone and incorporate appropriate and meaningful ecological compensation measures. This could, for example, include contributing to targeted research into the thermal properties of bat roosts in large, mature forests to improve artificial roost design and provide broader conservation benefit. However, it is important to note that such measures would not fully offset the loss of existing mature habitat.

I also note that my earlier query regarding the legal protection of the remaining SNAs on site remains outstanding. Protection of at least the western remnant (outside the Significant Mineral Extraction Zone), which showed particularly high bat activity, should be considered.

Regards,

Britta Deichmann

Director / Senior Ecologist

Ecological Potential Ltd.

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From: [Britta Deichmann](#)
To: [Jaimee Cannon](#); [Hayley Thomas](#); [Ian Boothroyd](#); [Andrew Blayney](#); [Katie Huesser](#); [Tyler Sharratt \(Winstone Aggregates\)](#)
Cc: [Quentin Budd](#)
Subject: External Sender: Fwd: LU/0160/25 - Whitehall Quarry - Ecologist Review - Memo for Bat Roost Mitigation
Date: Wednesday, 15 April 2026 3:19:34 pm

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Hi everyone,

Please find Tertia's email response that I was referring to in my previous email below.

Regards,

Britta Deichmann
Director / Senior Ecologist

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----- Forwarded message -----

From: **Tertia Thurley**
Date: Wed, 15 Apr 2026 at 11:14
Subject: RE: LU/0160/25 - Whitehall Quarry - Ecologist Review - Memo for Bat Roost Mitigation
To: DLVC_ECOLOGICAL POTENTIAL LTD

Kia ora Britta

Firstly, I can't think how monitoring local bat activity will be useful. If it declines, increases or stays the same, what does that mean, and what will be the response.

My primary concern continues to be the loss of 5.46 ha of mature tawa forest in an area where there are very high levels of bat activity. The mature tawa forest may be providing valuable roosts for long-tailed bats that is not replaceable. This is because

- Long-tailed bats prefer the oldest and largest trees to roost in when raising young, which are found in mature forests (O'Donnell & Sedgely 2006). They have already lost most of this preferred roosting habitat in the Waikato.
- Long-tailed bats have very specific thermal requirements for raising young, and these roosts are rare in any landscape, but even rarer when there is less mature forest (O'Donnell & Sedgely 2006)
- In large, mature forests, long-tailed bats have hundreds of communal roosts which they move between (O'Donnell & Sedgely 2006). In urban areas such as Hamilton, it is likely that they have only tens of roosts which they move between, because roosts are so sparse in the environment (De Krout 2009). This is the direction in which we are heading when mature forest is felled.

- When suitable roosting sites are sparse, bats are forced to use sub-optimal roosts, and this lowers their survival (Pryde et al 2006, Sedgely & O'Donnell 2004).
- The benefits of planting to provide new roosts will not be realised for decades, and even then roosts are very likely to have poorer thermal qualities than those of the mature forest which has been removed, which may result in lower survival rates of bats.
- Artificial roosts are a poor substitution for natural roosts of mature forest because we don't know how to design artificial roosts which match the requirements of long-tailed bats. While something is known of thermal qualities of natural roosts for summer breeding, we don't know what thermal properties bats seek from winter roosts. Artificial roosts may also provide sub-optimal thermal qualities and result in lower survival of bats (see Bat Recovery Group Advice note: [Artificial bat roost advice note](#)).

While I support pest control, the scale which is being proposed carries considerable uncertainty whether bats will benefit. This is because the pest control area proposed in bat roosting habitat covers such a small area compared to the area in which a colony of bats may roost in (A sample of bats in Fiordland had individual roosting ranges of between 9.5 and 333 ha over approx. 2 weeks; O'Donnell 2001). If bats are roosting in the felled area of the northern patch of forest to be felled, then they are likely roosting within the remaining SNA. If bats are protected for one night while roosting within the pest control area, then the next night move 100m away into unprotected forest and are eaten, the pest control does not provide a benefit. There may be no benefit to bats unless pest control covers the entire roosting range of a colony of bats.

I also support legal protection of the remaining SNAs, however it is my opinion that residual effects remain after the proposed measures have been put in place. Therefore, I think that compensation is appropriate.

References:

Dekrout A 2009. Monitoring New Zealand Long-tailed Bats (*Chalinolobus tuberculatus*) in Urban Habitats: Ecology, Physiology and Genetics. PhD Thesis. University of Auckland.

O'Donnell 200. Home range and use of space by *Chalinolobus tuberculatus*, a temperate rainforest bat from New Zealand. J. Zool. London 253: 253-264.

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Pryde MA, Lettink M, O'Donnell CFJ 2006. Survivorship in two populations of long-tailed bats (*Chalinolobus tuberculatus*) in New Zealand. New Zealand J Zoology 33:2.

Sedgely JA, O'Donnell CFJ 2004. Roost use by long-tailed bats in South Canterbury: examining predictions of roost-site selection in a highly fragmented landscape. New Zealand Journal of Ecology 24(1):1-18

Ngā mihi

Tertia

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Tertia Thurley

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