



South Catchment Western Pit Bat (Pekapeka) Management Plan

Prepared for:
Graymont NZ Limited

Prepared by:
Phoenix Ecology



Preamble

Phoenix Ecology Ltd have been contracted by PDP on behalf of Graymont (NZ) Ltd to prepare a Pekapeka (Bat) Management Plan ('BaMP') building on a document originally prepared by Ecology New Zealand Ltd (ENZL, February 2022¹) as a base. The BaMP relates to the creation of the South Catchment Western Pit ('the Pit') adjacent to the existing Oparure Quarry.

This BaMP incorporates findings from a site visit completed on 12 November 2024, during which the current status of trees and vegetation subject to Habitat Assessment was reviewed. This site visit supplemented earlier assessments, including the habitat assessment and roost tree surveys originally completed by ENZL (2022) and WSP (2021), as reported in the Draft Terrestrial Ecological Impact Assessment (ENZL, 2021). As a result, one potential bat roost tree was added to the Habitat Assessment (Appendix 2).

This BaMP reflects the most recent Tree Removal Protocols² (issued by the Department of Conservation (DOC)) and emphasises the importance of implementing these protocols to reduce the risk of bat mortality or injury during vegetation clearance.

Executive Summary

This BaMP provides a framework for avoiding, minimising, and mitigating potential adverse effects on the long-tailed bat (*Chalinolobus tuberculatus*), a Threatened – Nationally Critical species, associated with the development of the South Catchment Western Pit ('the Pit'), which is to be developed adjacent to Graymont's existing pit at the Oparure Quarry. The BaMP sets out measures to protect bat habitat and prevent harm to individual bats during vegetation clearance and associated activities.

Following recent design modifications, the footprint of the Pit has been adjusted to avoid direct impacts on Sites 5 and 6. These areas were identified as containing potential bat roost habitat. This adjustment significantly reduces the potential for adverse effects on long-tailed bats within the project area.

The management procedures outlined in this plan are designed to ensure compliance with the Wildlife Act 1953 and current best practices, including Department of Conservation (DOC) protocols for minimising the risk of felling occupied bat roosts.

¹ Ecology New Zealand Ltd. (2022). *Bat management plan prepared for Graymont NZ Limited* (Report No. 21243.1-002Rev0).

² <https://www.doc.govt.nz/globalassets/documents/conservation/native-animals/bats/bat-recovery/protocols-minimising-risk-felling-occupied-bat-roosts.pdf>



Management Actions / Procedures

The following list details the management procedures that are prepared.

1. Appoint a Project Bat Ecologist (PBE):

A qualified and DOC-approved bat specialist is to be appointed to oversee implementation of the BaMP.

2. Avoidance Measures:

As the entire South Catchment Western Pit will be cleared to enable quarrying, full avoidance of tree removal is not possible. However, where practicable outside the active footprint, impacts will be minimised by retaining individual trees or limbs, adjusting works at site margins, and timing vegetation removal to reduce disturbance. Within the footprint, clearance will follow the Tree Removal Protocol (Section 6).

3. Tree Roost Assessment:

All trees within the proposed clearance area are assessed for Potential Roost Features ('PRFs') by an ecologist and arborist.

4. Seasonal Restrictions:

Tree removal with PRFs is restricted to 1 October – 30 April to avoid sensitive breeding and hibernation periods.

5. Acoustic Monitoring:

Deploy Automated Bat Monitors ('ABMs') in the clearance area for at least two consecutive nights prior to tree removal, with monitoring undertaken only when weather conditions meet the thresholds specified in DOC survey guidelines (see Section 6.4(c)). Monitoring ensures no bats are present, and suggested ABM deployment locations are shown in Appendix 2 (Updated Tree Roost Suitability and ABM Locations Map) and Appendix 3 (WSP Roost Assessment Maps).

6. Pre-felling Surveys and Inspections:

Trees identified with PRFs are subject to:

- Roost watches (see Section 6.5(b)).
- Climbing inspections by an arborist under PBE supervision, using endoscopes where necessary.
- Tree felling may only proceed if no bat activity is detected.

7. Tree Felling Protocols:

- Trees are felled on the same day as the inspection.
- The PBE must remain on-site to inspect felled trees for bats and provide immediate direction if bats are discovered.

8. Management of Dead or Injured Bats:

- If a bat is found dead or injured, cease work immediately and do not resume until the PBE has assessed the situation and given clearance.
- Injured bats are to be taken to a qualified veterinarian.
- DOC must be notified within two hours.
- Dead bats are returned to DOC Te Kuiti Office.

9. Accidental Discovery Protocol:

If bats are discovered during works (outside of scheduled monitoring), cease work, notify the PBE, and implement the discovery protocol.



10. Reporting Requirements:

A post-works report must be submitted to the Council confirming compliance with protocols, including bat monitoring data and recommendations for future improvements.

11. Habitat Enhancement and Mitigation Measures:

- Retain and enhance vegetation where feasible, in accordance with the *Ecological Betterment Plan (EcoBP, Draft for Council consideration, Aug 2025)*³.
- Undertake restoration planting using native species, as outlined in the *EcoBP*.
- Implement predator and pest control measures consistent with the *Pest Management Plan (PMP, V2, 2025)*⁴.
- Install fencing to protect retained and restored habitats, aligned with provisions in the *Karst and Riparian Management Plan (KRMP, Draft V2, June 2025)*⁵.
- Provide replacement roost features, including artificial bat boxes and chainsaw hollows, as outlined in the Bat Management Plan (to be read in conjunction with the *EcoBP*).

³ Pattle Delamore Partners Ltd. (2025, August 11). Southern Catchment Western Pit Ecological Betterment Plan (Draft for Council consideration). Prepared for Graymont NZ Limited. Job reference C03870812

⁴ Pattle Delamore Partners Ltd. (2025, August 14). Southern Catchment Western Pit: Plant and Animal Pest Management Plan (Version 2). Prepared for Graymont (NZ) Limited. Job reference C03870822R001.



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Author: Titia Schamhart
 Reviewed by: Dr Hannah Mueller
 Version: Version 3 – BaMP by Phoenix Ecology (2025), based on ENZL (2022)
 Date: September 2025



1. Introduction

This Bat (Pekapeka) Management Plan ('BaMP'), prepared by Phoenix Ecology (2024) for Graymont (NZ) Limited ('the Client'), updates and extends the earlier BaMP prepared by ENZL (2022), and incorporates results from the November 2024 site visit. It has been prepared in relation to the development of the South Catchment Western Pit, adjacent to the existing pit at the Oparure Quarry, Te Kūiti. The BaMP has also been informed by recommendations from the Draft Terrestrial Ecological Impact Assessment prepared by ENZL (June 2021).

Specifically, it details methodologies that aim to manage potential indirect and direct impacts on long-tailed bats commensurately (*Chalinolobus tuberculatus*; Threatened – Nationally Critical⁶) associated with the proposed clearance of potential long-tailed bat habitat.

1.1. Background

Graymont NZ Ltd is creating a new pit (South Catchment Western Pit) adjacent to Graymont's existing operational pit at the Oparure Quarry. Following recent design modifications, the footprint of the South Catchment Pit has been adjusted to avoid direct impacts on Sites 5 and 6. These areas contain potential bat roost habitat and are no longer subject to vegetation clearance or disturbance under the current project plan. Bat management is based on designs and other information provided by Pattle Delamore Partners Limited and the client's wider project team. An initial draft Terrestrial Ecological Impact Assessment report was prepared by Ecology New Zealand Limited ('ENZL') in June 2021, which provided an assessment of the actual and potential adverse surface terrestrial ecological effects associated with the proposed new limestone pit, and recommendations for measures to avoid, remedy, mitigate or offset these impacts to a point that a net ecological (terrestrial) gain would be achieved.

ENZL carried out site assessments in October and November 2019, which included detailed vegetation assessments, fauna surveys and habitat assessments. Six acoustic bat monitors (ABMs – DOC AR4s) were set for 31 consecutive days from the 4th of October to the 7th of November 2019 (Appendix 2). Monitoring locations were scattered across the site in areas considered most likely to detect bat echolocation during foraging behaviour, specifically focusing on the gully system and bush block edges. Furthermore, ABMs were also focused on areas where potential roosting habitat occurred in order to establish if roosting actually occurred on-site.

Handheld bat detectors⁷ were also used during night work 30 minutes prior to sunset and 15 minutes after sunset to detect any potential bat activity. ENZL ecologists found potential bat roosting habitats within mature native bush blocks, isolated exotic and native trees scattered throughout the site, and potential cave systems. Long-tailed bats have been known to congregate in some cave sites within the wider Waitomo area (e.g., Grand Canyon and Ruakuri Caves)⁸. The open farmland and gully systems throughout the site also provide foraging opportunities for long-tailed bats. All the ABMs deployed on-site detected a low number of bat passes, and one feeding buzz was detected at Site 1 (Appendix 2).

⁶O'Donnell, C. F., Borkin, K., Christie, J. E., Davidson-Watts, I., Dennis, G., Pryde, M. A., & Michel, P. (2023). *Conservation status of bats in Aotearoa New Zealand, 2022*. Department of Conservation, Te Papa Atawhai.

⁷ Magenta Bat 4 Bat Detector, Magenta Electronics Ltd.

⁸ Clark, R., Floyd, C., & Clarkson, B. (2017). *Significant natural areas of the Waikato region: Karst ecosystems* (Waikato Regional Council Technical Report 2017/35). Waikato Regional Council.



No bat activity was recorded around cave entrances during monitoring in November. Twenty nine nights of the 31-night survey period were identified as suitable for recording bat activity, representing a suitable survey effort for a project of this scale and type. Site 2 (Appendix 2) targeted a large poplar within the lower reaches of a gully system and recorded the highest level of activity.

From the 22nd to the 26th of November 2021, WSP was commissioned by ENZL to undertake additional ecological field surveys due to COVID-19 boundary restrictions preventing ENZL from travelling outside of Auckland. WSP deployed seven ABMs throughout the project site in November 2021 (Appendix 2), which have recently been collected and require analysis. All individual trees and tree fragments within the project area were assessed by WSP for their habitat value and significance as potential roosting sites for long-tailed bats. These assessments were subsequently reviewed and confirmed by Phoenix Ecology. A total of 121 individual trees/areas of trees were identified and assessed for roosting suitability (Appendix 2). Most of the vegetation was assessed as low to moderate, with scattered individual high-value roost trees. The majority of the trees that were assessed as high were due to significant decay, and many will likely fall over within the next year or so. A total of 11 trees/areas of vegetation were assessed as high, while the remaining were assessed as low – moderate. The detailed mapping, by WSP, is provided in Appendix 3. A detailed table of the roost tree assessment is contained in the original BaMP.

Due to the confirmed presence of long-tailed bats on-site and the potential utilisation of the project area for commuting, foraging and roosting, bat management protocols will need to be adhered to with regard to the removal of any vegetation that may provide habitat to long-tailed bats. The Ecological Betterment Plan and the enhancement of Significant Natural Area (SNA) and karst ecosystems proposed within the draft Terrestrial Ecological Impact Assessment report will provide benefits to local bat populations utilising the area.



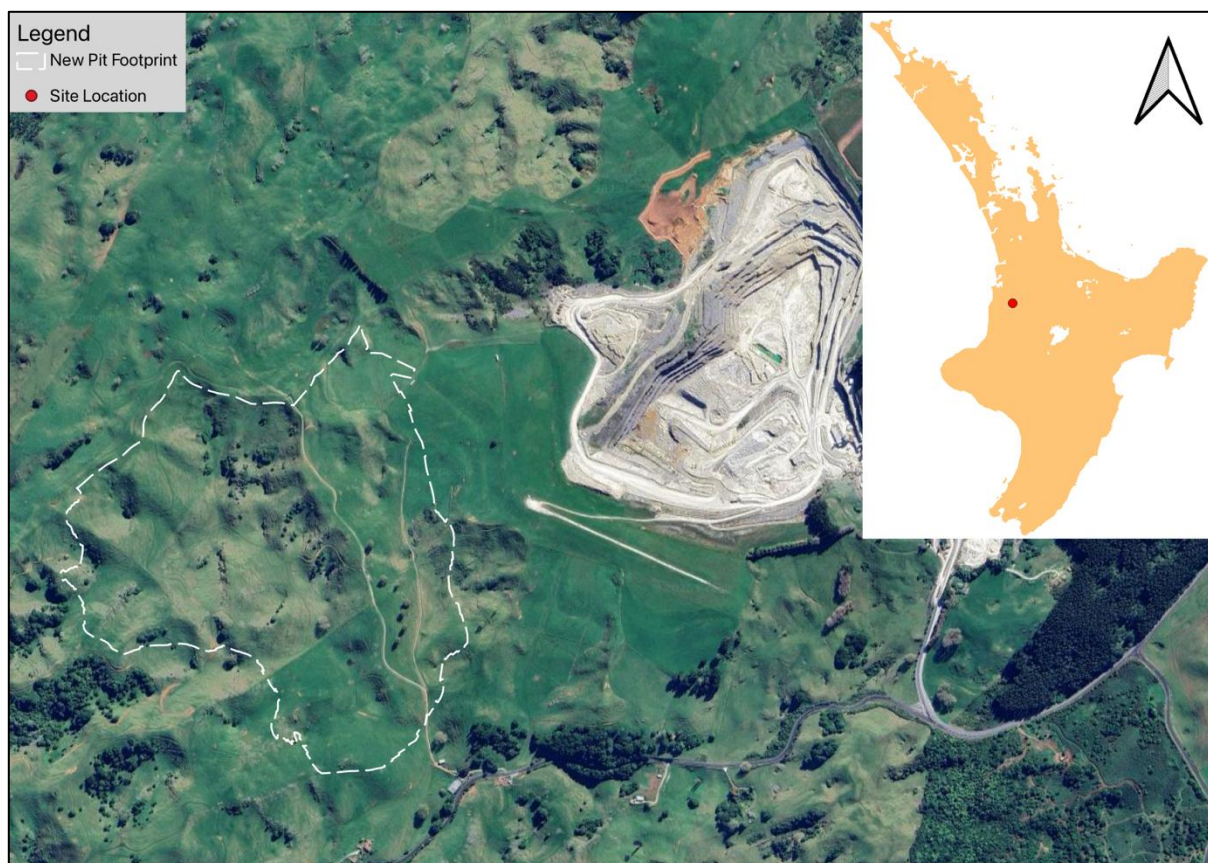


Figure 1: South Catchment Western Pit Footprint and Site Location.

1.2. Goals and Objectives of this Plan

The objective of this plan is to manage both the direct and indirect impacts on long-tailed bats, a species classified as Threatened (Nationally Critical)⁹. Specifically, the plan seeks to ensure that no long-tailed bats are harmed or killed during the removal of potential roosting habitats.

2. Definitions

Competencies: A set of skills and qualifications established by the NZ Bat Recovery Group to ensure that individuals working with bats are appropriately trained and competent (see Appendix 1).

Authorised Competent Bat Worker: A bat worker who has achieved the necessary ethical and professional standards to be officially registered as competent and authorised by the New Zealand Bat Recovery Group for their specific duties.

Project Bat Ecologist (PBE): The authorised and competent bat worker responsible for overseeing and implementing the BaMP.

ABM: Automated Bat Monitor

⁹ O'Donnell, C. F. J., Borkin, K. M., Christie, J. E., Lloyd, B., Parsons, S., & Hitchmough, R. A. (2018). *Conservation status of New Zealand bats, 2017* (New Zealand Threat Classification Series No. 21). Department of Conservation.



Tree Removal Protocol: Procedures for evaluating trees for their potential as bat roosts and the necessary management measures to implement before any felling of these trees.

Potential bat roost: A tree which provides features that are able to be used for bat roosting (refer to Section 6.3).

Valid survey night: A night that meets the following conditions for a survey:

- Nightly temperatures of at least 10°C for the first four hours after sunset in the North Island and 7°C in the South Island¹⁰.
- Ideally, there should be no or very little precipitation within the first four hours after official sunset. However, a light mist or occasional drizzle may be acceptable, as determined by the PBE accredited with Competency 3.1¹⁰.
- The wind should be no stronger than light wind within the first four hours after official sunset. Stronger winds may affect bat activity and the detection of bats during roost watches or surveys¹¹.

3. Project bat ecologist (PBE)

An authorised competent bat worker shall be appointed as the PBE. The PBE shall hold the required competencies to implement this BaMP in accordance with DOC's bat handler competency framework (refer to Appendix 1). As the DOC bat handler competency framework is periodically updated, the most current version of the competencies shall be strictly adhered to throughout the implementation of this BaMP.

4. Avoidance

As the entire South Catchment Western Pit will be cleared to enable quarrying, full avoidance of tree removal is not possible. However, where practicable outside the active footprint, impacts will be minimised by retaining individual trees or limbs, adjusting works at site margins, and timing vegetation removal to reduce disturbance. Relocation, when undertaken, refers solely to vegetation (e.g. whole trees or sections of felled trees containing potential roost features) and does not include the relocation of bats. Within the footprint, clearance will follow the Tree Removal Protocol (Section 6).

5. Wildlife Act

The Wildlife Act (1953) provides statutory protection for indigenous fauna, with exceptions for species listed in Schedules 1 to 5. This protection extends to safeguarding these species from harm, disturbance, or exploitation. All indigenous bats are fully protected under the Act, meaning that any bat surveys or the felling of potential roost trees must be carried out under the supervision of a Department of Conservation-approved bat ecologist with the necessary certifications.

¹⁰ Bat Recovery Group. (2025). Bat monitoring guidelines using automatic bat detectors (Version 5, September 2025). Department of Conservation, Wellington.

¹¹ O'Donnell, C. F. J. (2000). Influence of temperature and weather on the activity of long-tailed bats (*Chalinolobus tuberculatus*) in New Zealand. *New Zealand Journal of Zoology*, 27(3), 207-221.



When the Tree Removal Protocol detailed below is followed, the likelihood of a bat being present in a tree at the time of felling is very low. However, given their small size and cryptic behaviour, there is still a chance that bats may occasionally be missed.

An Accidental Discovery Protocol is provided below to outline the appropriate steps for managing bats found during tree felling. Any handling of bats under this protocol must be conducted by DOC-approved and competent bat ecologists (see Appendix 1 for information on required competencies).

6. Tree removal protocols

6.1. Overview

The confirmed presence of long-tailed bats at the site necessitates that all potential roost trees are inspected by an arborist under the supervision of a PBE prior to felling. The following protocols are based on the original BaMP, updated to align with the most recent DOC Tree Removal Protocols¹² where applicable.

Tree felling protocols will be implemented during any required vegetation clearance to minimise the risk to bats when removing potential roost trees. Generally, these protocols outline steps to determine whether bats are roosting in trees scheduled for removal, taking into account seasonal constraints:

- Identification of any potential roost trees (checking for Potential Roost Features ('PRF'));
- Pre-felling acoustic monitoring surveys
- Tree checking by a qualified arborist; and
- Tree observations (roost watches).

The main steps of these protocols include identifying any trees with PRF, conducting pre-felling acoustic monitoring just before tree removal, performing roost watches, potentially having arborists visually inspect PRF under the supervision of a PBE, and overseeing the tree removal process by the PBE.

6.2. Seasonal restrictions

Table 1 summarises when each of the actions outlined below can be undertaken.

Table 1 Summary of timing restrictions for bat monitoring and tree felling

Activity	Season when it can be undertaken
Roost tree assessment: checking for PRF	All year
Acoustic monitoring	1 October-30 April, inclusive
Pre-felling inspections and felling of trees with PRF	1 October-30 April, inclusive

¹²Department of Conservation. (2024). Protocols for minimising the risk of felling occupied bat roosts. Version 4. Wellington, New Zealand: Department of Conservation.



6.3. Assessment of trees for Potential Roost Features (PRF)

All individual trees and tree clusters within the project area were initially assessed by WSP for their habitat value and significance as potential roosting sites for long-tailed bats. In total, 121 individual trees or areas of trees were identified and evaluated for their suitability as roosts (refer to Appendix 2 and 3). The assessment criteria are detailed in Table 2 below.

Table 2. Criteria for assessing suitability of tree(s) as roosting habitat for long-tailed bats.

Suitability as a roost	Justification of Assessment
Low	A tree of at least 15cm Diameter at Breast Height ('DBH') but with no roost features visible or with only limited roosting potential e.g. loose bark present but not sufficient to provide shelter for roosting bats.
Moderate	A tree of at least 15cm DBH with one or more roost features that could be used by individual bats or where it is not clear from the ground inspection whether roost features are present or not and therefore requires further inspection.
High	A tree of at least 15cm DBH with one or more roost features which could provide roost habitat for several bats due to their size and ability to provide sufficient shelter and protection.

Phoenix Ecology re-assessed all tree and tree clusters and confirmed that all trees previously deemed suitable for roosts by WSP remain of high value.

Prior to vegetation clearance, trees with PRF will need to be monitored for bat activity by the PBE. Trees greater than 15 centimetres in DBH within the vegetation clearance area must be systematically surveyed to identify trees that contain one or more of the following PRF:

- Cracks, crevices, fractured limbs, or other deformities large enough to support roosting bat(s).
- Sections of loose flaking bark large enough to support roosting bats.
- A hollow trunk, stem or branches.
- Deadwood in canopy or stem of sufficient size to support roost cavities or hollows.
- Dense epiphyte clumps.

The mapped locations of assessed trees and ABMs are provided in Appendix 2 (Updated Tree Roost Suitability and ABM Locations Map) and Appendix 3 (WSP Roost Assessment Maps). These figures indicate the areas where the Tree Removal Protocols in Section 6 apply, and should be used by the PBE and arborists to plan and implement surveys and clearance activities.

6.4. Acoustic monitoring

- a) Acoustic monitoring is conducted to reduce the risk of performing pre-felling inspections on trees actively used as bat roosts (i.e., trees where bats are roosting on the day of inspection). This approach helps to minimise unnecessary disturbance to roosting bats.
- b) At least one Acoustic Bat Monitor (ABM) will be deployed in areas identified as suitable habitat through a pre-construction bat roost survey, at least two days before the initial inspections and felling commence. The ABMs will be programmed to start recording 30



minutes before sunset and stop 30 minutes after sunrise. With an approximate detection radius of 50 metres (subject to interference from vegetation or other obstacles), ABMs will be spaced 50 metres apart throughout the clearance area to ensure comprehensive coverage.

- c) For the two days prior to tree felling must meet specific weather conditions to ensure bat activity can be reliably assessed. These conditions include:
- **Temperature:** Must be 10°C or greater for at least the first four hours after sunset.
 - **Precipitation:** Minimal to no rain during the first four hours after sunset. Light mist or occasional drizzle may be acceptable if determined by the PBE.
 - **Wind:** No more than light wind during the first four hours after sunset, as strong winds can reduce bat activity and detection.

Adverse weather may discourage bats from leaving the tree, leading to undetected presence on ABMs. If the conditions are not met, the PBE will proceed under the assumption that bats remain in the tree, necessitating inspection of every tree by an arborist to avoid potentially lethal outcomes.

- d) The PBE will analyse ABM recordings at the start of each day scheduled for inspections and felling, with a focus on bat activity levels during the final hours before sunrise.
- e) If the PBE detects relatively high bat activity on any ABM in the area designated for clearance during the last hour before sunrise (indicating a high likelihood of bats roosting in nearby trees), no tree inspections or felling will take place that day in the vicinity of the affected ABM.
- f) If no significant bat activity is detected, the PBE will identify areas with little to no bat activity during the hour before sunrise. These areas will be prioritised for inspections on that day, where practical.

6.5. Pre-felling surveys and inspections

- (a) Canopy trees and potential or identified bat roost trees shall not be felled during periods when bats are likely to be heavily pregnant or when non-volant young may be present (from November to February, inclusive). Felling is also restricted during colder months (when temperatures drop below 10°C in the first four hours after sunset) when bat activity is reduced.
- (b) Where the PBE identifies potential roost features from the ground, or where consistently high levels of bat activity around a tree indicate roosting potential, the tree must be assessed prior to felling by either (i) roost watches or (ii) arborist inspection.

Under the **roost watch option**, dusk and dawn watches are undertaken on valid survey nights (i.e. under suitable weather conditions as outlined in Section 6.4), beginning 30–



60 minutes before sunset and two hours before sunrise, and continuing until it is too dark to observe at dusk and one hour after sunrise at dawn. If bats are confirmed emerging during dusk watches but confirmed not to return during dawn watches, using a suitable thermal camera, the tree may be deemed unoccupied for the purpose of felling. In this case, an arborist inspection of every cavity is not required, although this decision remains at the discretion of the PBE. If evidence of bats remains uncertain following roost watches, the PBE may still require an arborist to climb and inspect the tree, documenting potential roost features with photographs, video, and the use of detectors or an endoscope as appropriate.

Under the **direct arborist inspection option**, the PBE may instead choose to have an arborist climb and inspect the tree on the day of felling. In this case, all cavities and potential roost features must be examined, documented, and reported to the PBE before felling proceeds.

- (c) If no evidence of bats or signs of their presence is found during the inspection, the tree may be felled on the same day only. The PBE must remain on-site throughout all tree felling operations to provide guidance if bats are detected and to inspect each felled tree for signs of bat roosts.

6.6. Communications

After the approved PBE has evaluated the results of the visual inspections, the following communication procedures will be implemented:

- (a) If no bats are observed or detected, the PBE will authorise the felling of the affected tree(s). Once all tree felling is completed, an email report summarising the survey results will be provided for transparency/consultation to a representative of the Department of Conservation (Te Kūiti Office)¹³, or to another DOC officer nominated in writing by the Operations Manager.
- (b) If the PBE determines that bats are roosting in the trees scheduled for felling, they will notify the arborist and the designated representative of Graymont NZ Ltd, indicating that the affected tree(s) cannot be felled. Additionally, an email will be sent to a representative of the Department of Conservation (Te Kūiti Office)¹³ outlining the survey results.
- (c) A record of any trees containing bat roosts will be kept, detailing the size, location, and type of tree.

6.7. Dead or injured bats

¹³ tekuiti@doc.govt.nz



- (a) Any bats discovered during felling, whether trapped in a roost or found on the ground, must be handled and/or retained briefly (e.g., if deceased or possibly injured) for inspection by the PBE. If bats are confirmed to be present at the site before construction, the PBE will notify a wildlife veterinarian so that veterinary care is available should any bats be injured in the course of tree felling or related works. All bats found after felling must be taken to a veterinarian for triage or further treatment. The most suitable veterinary options close to the project area include Hamilton Zoo or Global Veterinary Services at 308 Gordonton Road, Gordonton. Bats found on the ground should be kept under observation for three days, ensuring they do not enter torpor, so that any injuries or severe bruising can be identified and treated. Mealworms should be provided in case the bats need to be fed during this observation period. The veterinarian must be ready to administer subcutaneous fluids, as bats are prone to dehydration. Vets shall be given a copy of 'Initial veterinary care for New Zealand Bats'¹⁴ and 'Bat care advice for first responders'¹⁵, which was prepared for the Department of Conservation, the Wildlife Society of the New Zealand Veterinary Association, and the New Zealand Transport Agency.
- (b) The Department of Conservation (Te Kuiti Office or Department of Conservation Hotline if after hours¹⁶) shall be contacted no longer than two hours after a potentially injured or dead bat is found.
- (c) Any bat that is found dead or must be euthanised will be returned to the Te Kuiti Department of Conservation Office.
- (d) Department of Conservation advice shall be sought with regards to the rehabilitation requirements of any injured bats. For example, legislative requirements will need to be considered.
- (e) Any rehabilitated bat shall be released in the same general location in which it was found. Such releases shall occur after works at the release site have been completed.

6.8. Accidental discovery protocol

If bats are not detected during survey work, but are later discovered during construction activities, all work must cease immediately. Works may only recommence once the PBE has inspected the site, confirmed that appropriate mitigation measures have been put in place, and authorisation to proceed has been provided by the PBE in consultation with the Department of Conservation (Te Kūiti Office). If a bat is found on the ground or injured, the PBE will follow the protocols described above (Section 6.7).

6.9. Reporting

Following implementation of bat management steps outlined in this BaMP, the PBE shall prepare a report within 4 weeks of an individual vegetation removal event.

¹⁴ [https://www.doc.govt.nz/nature/native-animals/bats-pekapeka/resources-for-bat-workers/#:~:text=Initial%20veterinary%20care%20for%20New%20Zealand%20bats%20manual%20\(PDF%2C%202%2C030K\)](https://www.doc.govt.nz/nature/native-animals/bats-pekapeka/resources-for-bat-workers/#:~:text=Initial%20veterinary%20care%20for%20New%20Zealand%20bats%20manual%20(PDF%2C%202%2C030K))

¹⁵ <https://www.doc.govt.nz/globalassets/documents/conservation/native-animals/bats/bat-recovery/bat-care-advice-first-responders.pdf>

¹⁶ 0800 DOC HOT



This report shall include:

- Confirmation that vegetation removal operations were undertaken in accordance with the protocols contained in this BaMP and associated consent conditions;
- Details of work undertaken prior to removal of all potential bat roost trees under the requirements of the protocols, including the species, DBH, total number and GPS coordinates of the potential bat roost trees removed, a description of acoustic monitoring undertaken and details of results; and
- Recommendations for potential changes to improve the effectiveness of bat management in relation to the scope of this BaMP, if required.

The completed report shall be submitted to the consent holder, the Department of Conservation (Te Kūiti Office) and Tangata Whenua within the four-week timeframe. Reporting to the Waitomo District Council and Waikato Regional Council is not required, as this BaMP is a voluntary plan rather than a consent condition. In addition, this BaMP shall be reviewed at least every three years on a voluntary basis by the consent holder in consultation with Tangata Whenua and relevant experts, to determine whether updates are required in light of revised DOC protocols or new best practice guidance. Vegetation clearance at the South Catchment Western Pit will occur progressively in discrete stages over the life of the quarry (approximately 53 years). Overburden from new stages will be used to rehabilitate previously quarried sections. Accordingly, vegetation removal protocols and associated bat monitoring will be applied stage by stage, rather than as a one-off event.

7. Options to address adverse effects

Indirect adverse effects of the quarry expansion on bats in the area are expected, including disturbance, habitat loss, and fragmentation. These effects will be addressed through the following management measures, which form part of this BaMP and are cross-referenced to the Ecological Betterment Plan (EcoBP, Aug 2025), Karst and Riparian Management Plan (KRMP, Draft V2, 2025), and Pest Management Plan (PMP, V2, 2025).

7.1. Vegetation retention

A key recommendation is the retention of existing vegetation wherever possible. Retention of existing vegetation within the main quarry footprint will not be possible, as this area will be fully cleared to enable quarrying activities. However, opportunities for vegetation retention remain in surrounding areas, particularly gullies and margins that lie outside the direct footprint. Preserving mature trees with features such as hollows, cracks, or peeling bark in these areas can provide potential roosts for bats. Retained vegetation will also contribute to ecological connectivity, supporting safe commuting routes for bats between roosting and foraging areas. These retention measures will also need to be integrated with the proposed gully restoration under the EcoBP.

7.2. Restoration planting

Restoration planting will be implemented in accordance with the EcoBP to compensate for habitat loss. The EcoBP specifies approximately 2.5 ha of planting designed to link the existing SNA with the



proposed new SNA (see Figure 1, EcoBP: Site Overview), as well as riparian planting to strengthen ecological connectivity. Planting will prioritise native species that develop hollows or attract insects over time, providing both roosting and foraging opportunities for bats. The restoration will focus on establishing continuous canopies and corridors adjacent to retained vegetation and karst features, thereby reducing fragmentation and enhancing safe commuting routes. To ensure successful outcomes, restored areas will be subject to monitoring and active maintenance, with particular emphasis on the early stages of establishment.

7.3. Predator and plant pest control

Predator and plant pest control is vital to protect bats and improve habitat quality. Predators such as rats, stoats, and possums pose significant threats to bat populations, and their control should form part of the restoration of retained habitat across the site. Regular pest monitoring helps to assess the effectiveness of control measures and guide adjustments as needed. Similarly, controlling invasive plant species is essential to prevent habitat degradation and maintain the ecological integrity of both retained and restored areas. This measure will be implemented in accordance with the PMP.

7.4. Fencing

Fencing is recommended to safeguard sensitive habitats, including retained vegetation and restoration sites, from livestock and human disturbance. Properly designed fencing can prevent grazing damage and help delineate protected areas. This measure is provided for in the KRMP, which requires fencing to protect sensitive habitats and restored areas.

7.5. Bat Reserve and Roosting Habitat Enhancement

To mitigate the potential loss of bat roosts during the quarry development, Graymont will establish and maintain a designated “Bat Reserve” at or near the quarry site. The Bat Reserve will be integrated into the restoration areas identified under the EcoBP, KRMP, and PMP, and will be enhanced with bat-specific measures. These include installing approximately 25–50 roost boxes in clustered groups across suitable habitat and creating 10–20 chainsaw hollows in retained large trees to provide immediate roosting opportunities.¹⁷ In addition, mature trees will be retained wherever practicable, and occupancy of both artificial and natural roosts will be monitored. Note that these actions will take place within 3 years of the commencement of the resource consent, consistent with the EcoBP, KRMP, and PMP. As with those plans, monitoring should continue for at least 5 years after planting to assess outcomes. Annual bat monitoring will be undertaken on a similar 5-year cycle to confirm the uptake of roost features and the overall effectiveness of the Bat Reserve. Long-term success will be addressed through the establishment of native tree species capable of developing natural roost features (e.g. cavities, loose bark, hollows), supported by a diverse planting mix of fast-growing pioneer and slower-growing species, sustained predator control, and evidence of bat use of the artificial roost features.¹⁸

¹⁷ Department of Conservation, Bat Recovery Group. (2025). Artificial roosts advice note: Guidance on the provision of artificial roost structures for long-tailed bats (*Chalinolobus tuberculatus*). Department of Conservation, Wellington, New Zealand.

¹⁸ Department of Conservation, Bat Recovery Group. (2025). Artificial roosts advice note: Guidance on the provision of artificial roost structures for long-tailed bats (*Chalinolobus tuberculatus*). Department of Conservation, Wellington, New Zealand.



Results of installation, maintenance and monitoring will be included in the annual bat management report submitted to the DOC Te Kūiti Office and tangata whenua. This measure is specific to the BaMP and informed by DOC's Artificial Roosts Advice Note (2025)¹⁸.



Appendix 1: DOC Bat Competencies

1. Catching bats

1.1 Use of mist net

- 1.1.1 Extract, bag and store correctly a total of 30 individuals of either species
- 1.1.2 Demonstrate correct mist net placement, set up, smooth operation, appropriate mist net attendance, assessment of risks and safe extraction and handling on 10+ different nights.

1.2 Use of harp traps (free standing)

- 1.2.1 Lead identification of appropriate harp trapping sites and set up and monitor trap(s) on 10+ different nights
- 1.2.2 Extract 10+ bats appropriately from free standing traps
- 1.2.3 Demonstrate harp trapping protocols (animal welfare considerations, trapping in the breeding season, rain, repair and maintenance etc)

1.3 Use of harp traps (at roost entrances)

- 1.3.1 Lead set up and monitoring of trap(s) on 10+ different nights
- 1.3.2 Extract 10+ bats appropriately from traps hoisted up trees
- 1.3.3 Demonstrate harp trapping protocols at roost entrances (safe trapping at tree roosts (risk management), predation risks, disturbance risks, animal welfare considerations, trapping in the breeding season, rain, repair and maintenance etc)

2. Handling bats

2.1 Bagging, storage, handling, measuring, weighing, sexing, aging, temporary marking and releasing appropriately:

- 2.1.1 For long-tailed bats: 50 individuals
- 2.1.2 For short-tailed bats: 50 individuals

2.2 Banding long-tailed bats:

- 2.2.1 50 individuals
- 2.2.2 Demonstrate knowledge of how to remove bands safely (2 methods; demonstrate on model bat)

2.3 Pit-tagging insertion in short-tailed bats:

- 2.3.1 Pit-tag insertion to short-tailed bats
- 2.3.2 Bat handling for pit tagging

Note that transponder skills require exacting standards and specialised training from a select few people, and if people need this skill, they should contact the Bat Recovery Group to apply to get trained.

2.4 Attaching radio transmitters (should first be competent in 2.1 and/or 2.2):

- 2.4.1 For long-tailed bats: watch 5 individuals having radio transmitters attached by a Competent Bat Worker or Authorised Trainer
- 2.4.2 For long-tailed bats: attach radio transmitters to 5 individuals correctly under supervision
- 2.4.3 For short-tailed bats: watch 5 individuals having radio transmitters attached
- 2.4.4 For short-tailed bats: attach radio transmitters to 5 individuals correctly under supervision

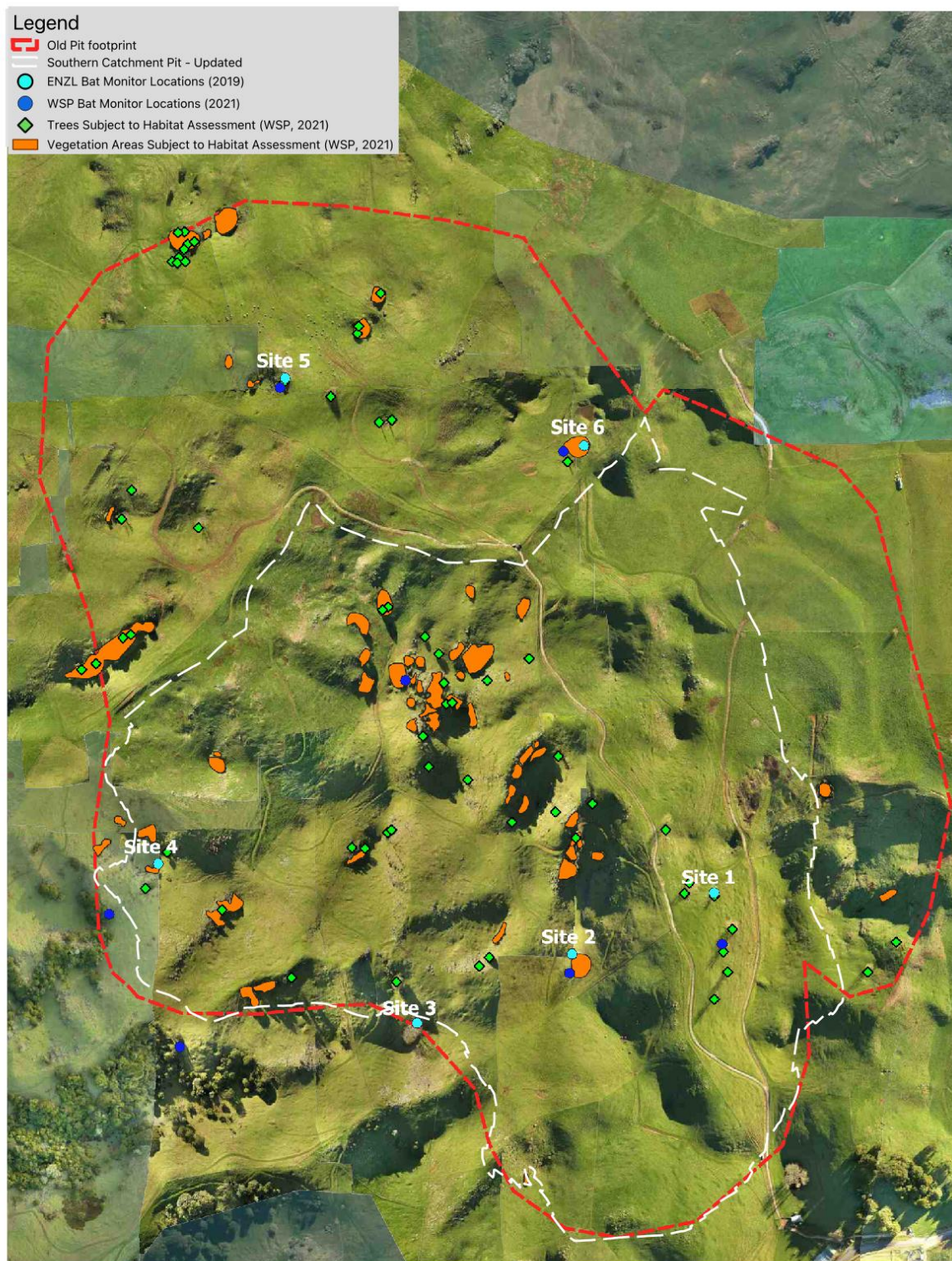


- 2.4.5 Demonstrate understanding of reasons for attaching transmitters, Animal Ethics issues, (risk management and animal welfare considerations, trapping)
- 2.5 Taking wing biopsies
 - 2.5.1 Watch 5 individuals having biopsies taken by a Competent Bat Worker or Authorised Trainer
 - 2.5.2 Take biopsies from 10 individuals under supervision
 - 2.5.3 Understand and follow the Standard Operating Procedure (available on request from Bat Recovery Group Leader)
- 3. High risk activities – Roost felling (all of these competencies include the understanding of what to do when bats are found during tree felling as per Appendix 6 of 'Initial Veterinary Care for New Zealand Bats'.¹⁹
 - 3.1 Assessing roost tree use using Automatic Bat Monitors - Demonstrate correct timing, placement, and identifications of bat detections for 10+ times according to DOC's Bat Roost Protocols.
 - 3.2 Undertake roost watches/emergence counts at 10+ occupied roosts where the entrance is visible.
 - 3.3 In at least two different forest/habitat types, including the forest/habitat type where trees are going to be assessed: evaluate 10+ potential roost features in trees (e.g., cavities, peeling bark, epiphytes).

¹⁹ Available at www.doc.govt.nz/bat-worker-resources



Appendix 2: Updated Tree Roost Suitability and ABM Locations Map



0 100 200 300 400 m



Sources: Map data sourced from drone

Date: 14/03/2025
Client: Graymont Quarry Ltd.
Project: Bat Management Plan - Update
Code: 01.014

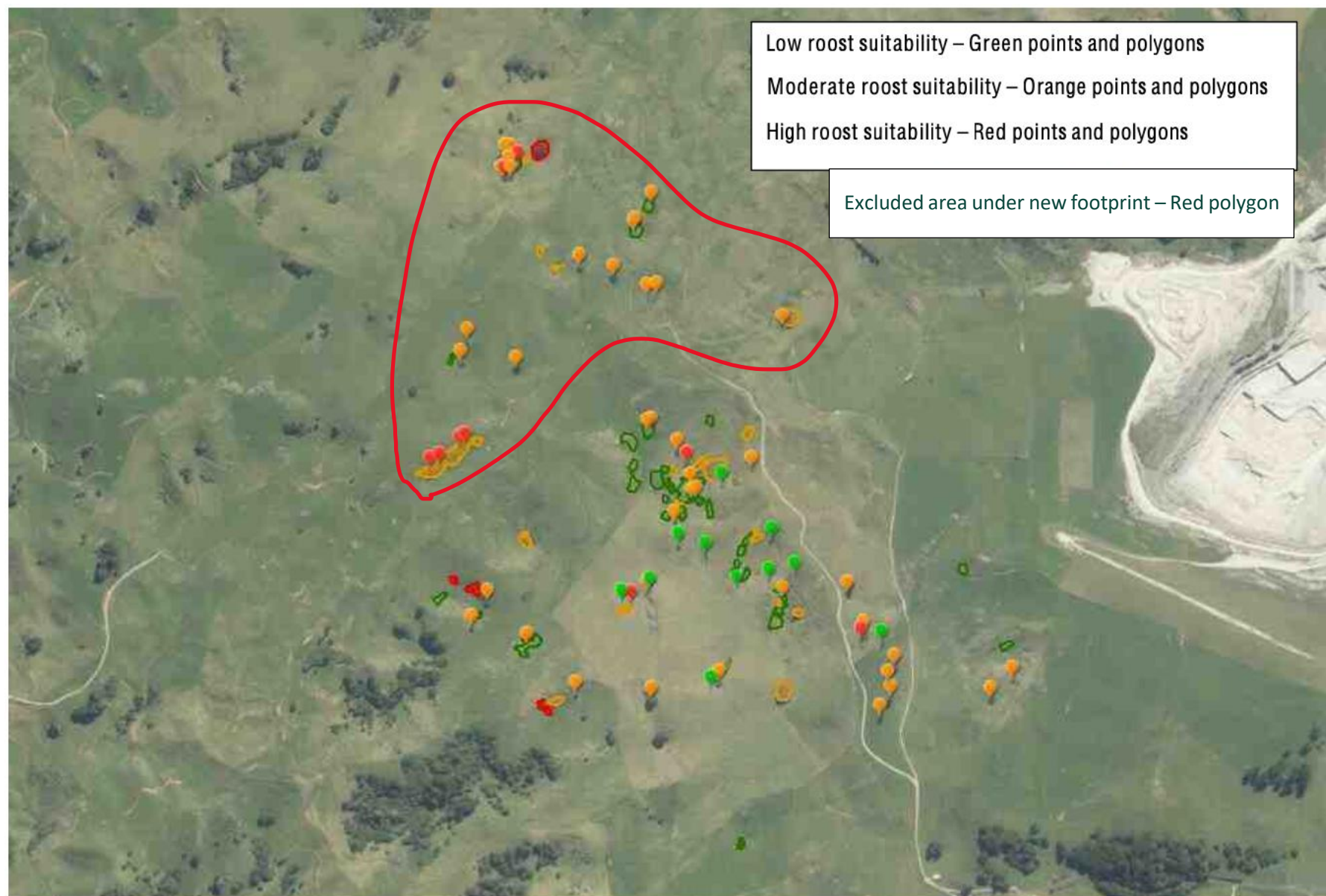


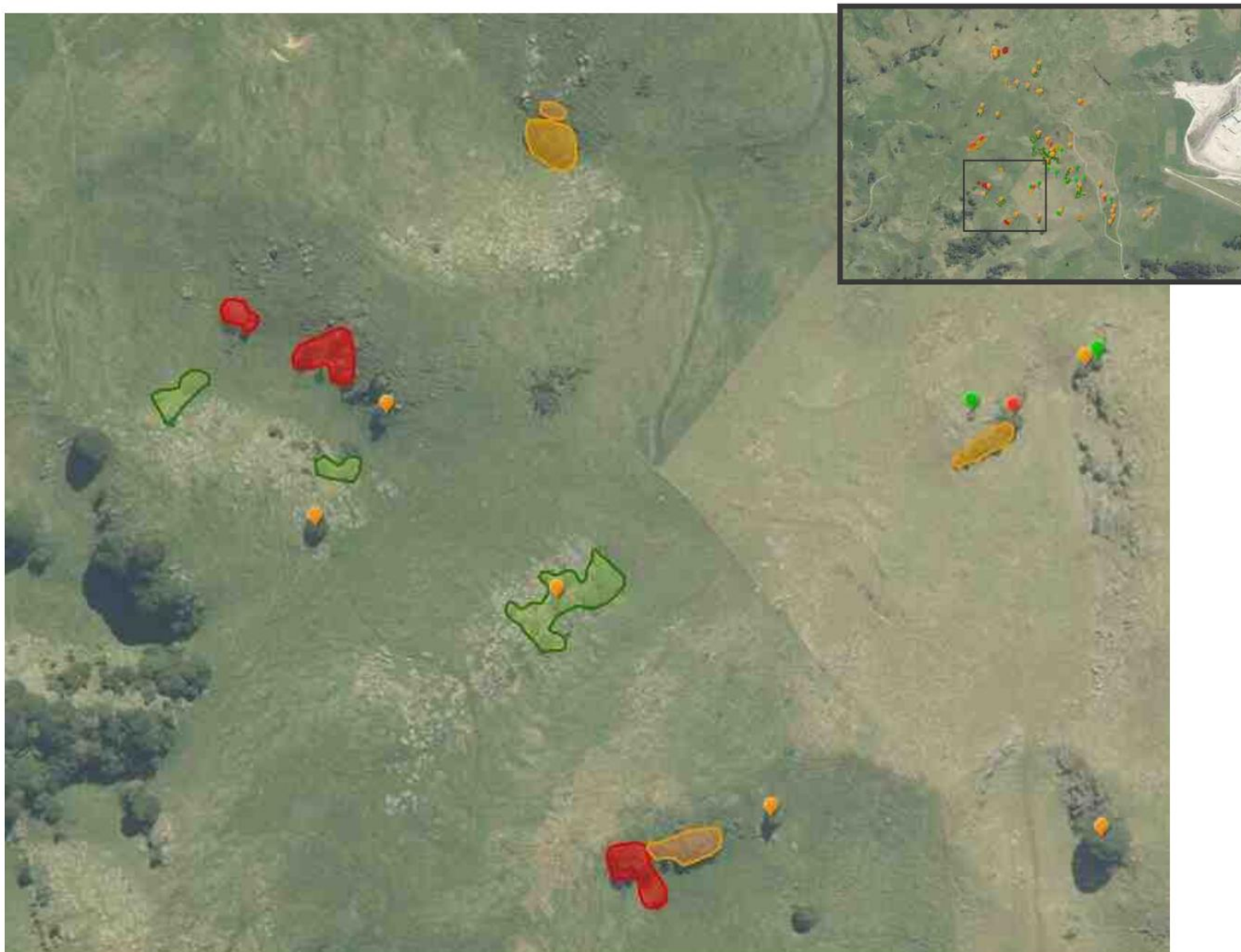
Appendix 3: WSP Roost Assessment Maps

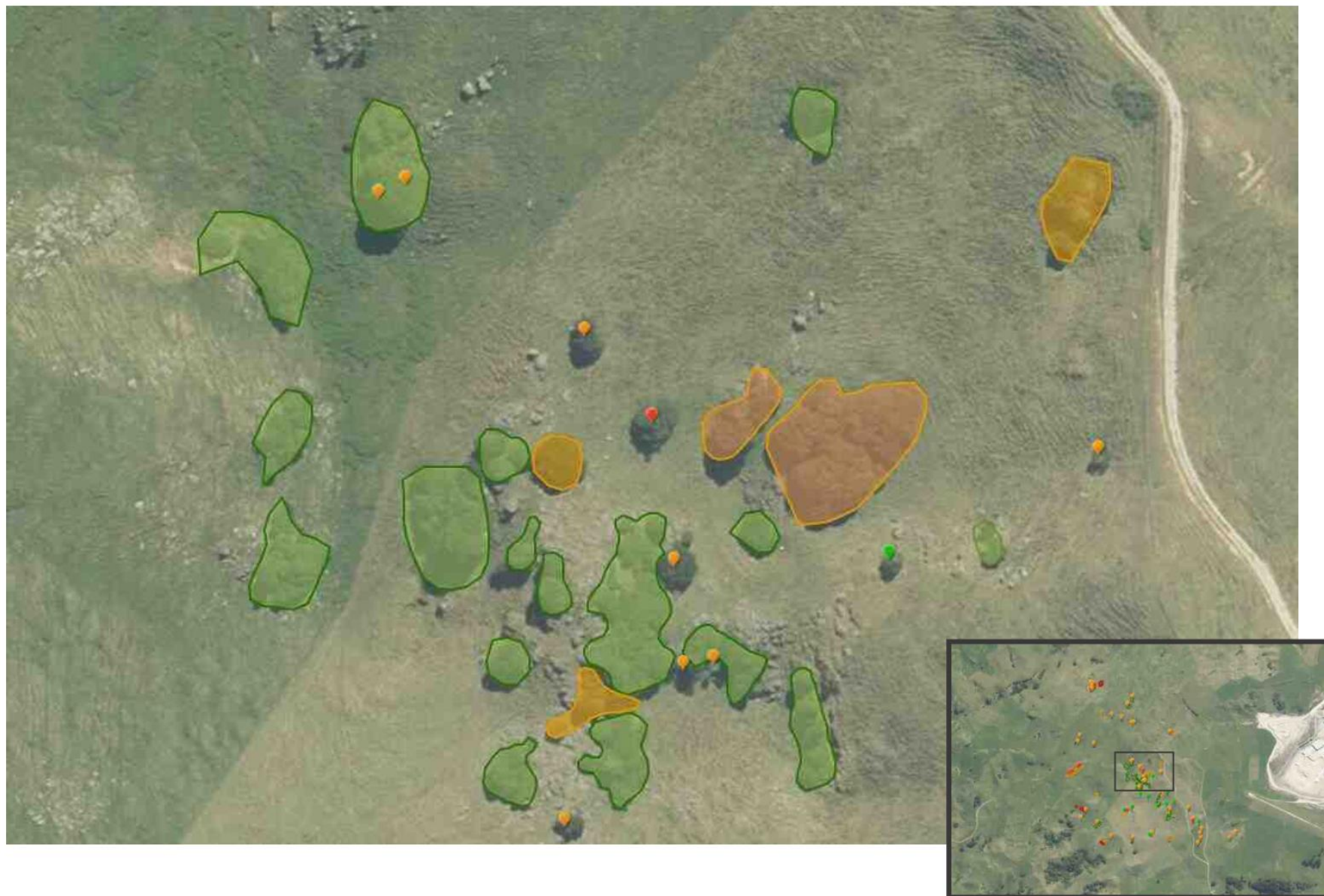
Note on Updated Pit Footprint (March 2025):

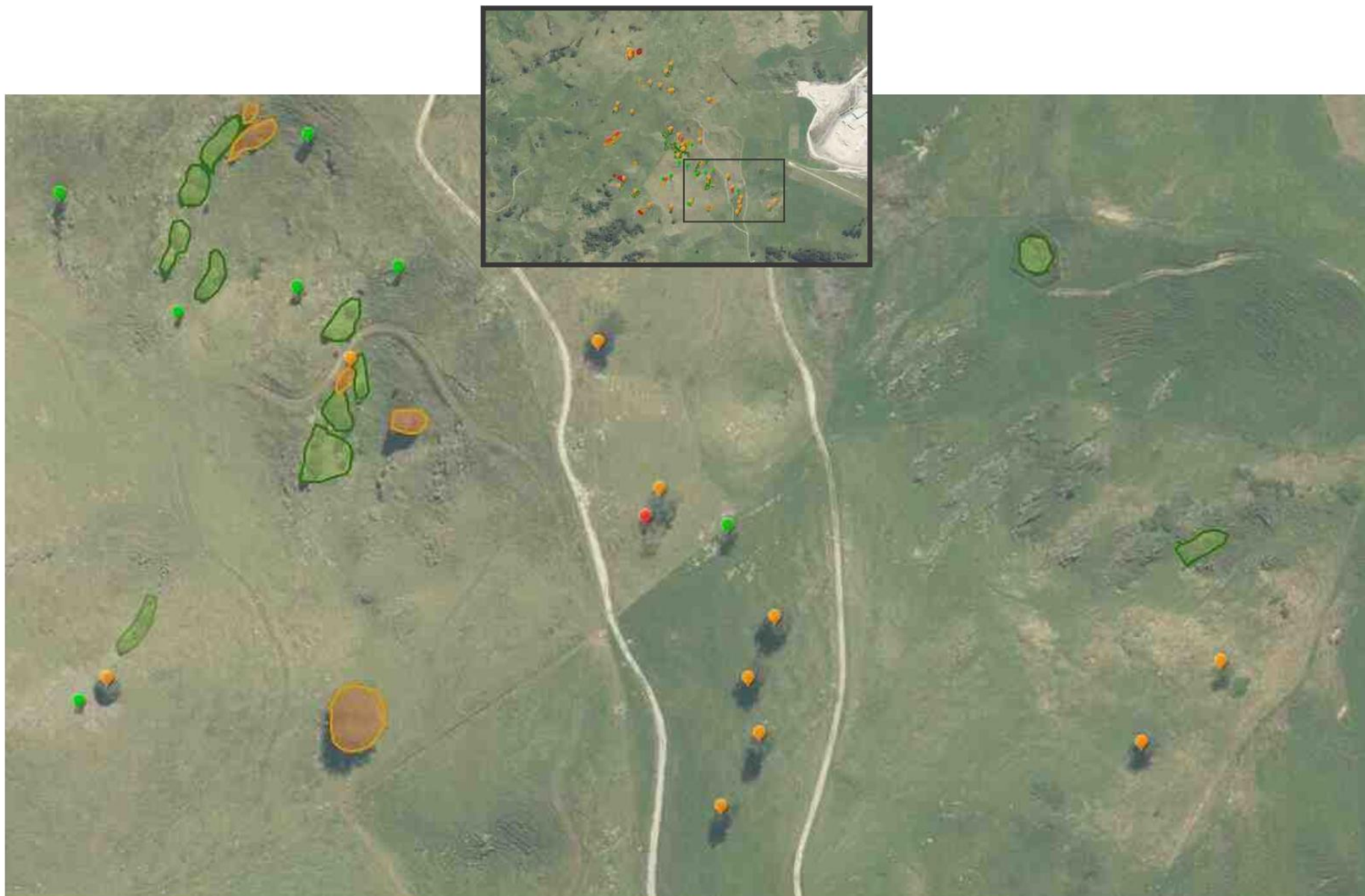
Following revisions to the proposed pit footprint, Sites 5 and 6 are no longer within the clearance or impact areas. The maps in this appendix show the original assessment areas but should be read with this update in mind. No tree clearance or management actions are proposed for Sites 5 and 6 under the current project scope.











Appendix 4: Summary of bat activity

Table 3. Summary of bat activity recorded on ABMs by ENZL from 2019 survey.

ENZL Site	Total passes	Nights with passes	Total feeding buzzes	Average passes per night
Site 1	7	6	1	0.241
Site 2	16	5	0	0.552
Site 3	10	5	0	0.345
Site 4	3	3	0	0.103
Site 5	7	7	0	0.241
Site 6	9	7	0	0.310
Total	52	17	1	0.299

Table 4. Summary of bat activity recorded on ABMs by WSP from 2021 survey.

WSP Site	Total passes	Nights with passes	Total feeding buzzes	Average passes per night
BM1	0	0	0	0
BM2	4	4	0	0.154
BM3	6	5	0	0.208
BM4	1	1	0	0.030
BM5	2	2	0	0.0769
BM6	1	1	0	0.0370
BM7	14	10	0	0.084
Total	28	23	0	0.084

