BLUEPRINT ECOLOGY

10 February 2026

# Lizard Assessment

# Haldon Station Solar Farm

PREPARED FOR LODESTONE ENERGY LIMITED

**PREPARED FOR:**

Lodestone Energy Limited

Level 2, 51 Hurstmere Road

Takapuna

Auckland 0622

**PREPARED BY**

Tony Payne, Principal Ecologist

Blueprint Ecology Limited

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# Contents

# 1.0 Introduction

## 1.1 Background

Lodestone Energy Limited (LEL) is seeking resource consents under the Fast-track Approvals Act 2024 (FTAA) for the development of a solar farm on a c. 320 ha area located on part of Haldon Station (**Figures 1** & **2**).

The site is located on the eastern side of Lake Benmore and south of the outlet of the Tekapo River at approximately 370 m elevation. The site is situated within a predominately pastoral setting that has been significantly modified from its pre-human state.

Blueprint Ecology Limited (Blueprint Ecology) was engaged by LEL to provide an expert assessment of the actual and potential effects to native lizards with respect of the FTAA substantive applications. This included:

- Assess lizard species and habitats known or predicted to be present over the site.
- Assess the actual and potential adverse effects of the construction and ongoing operation of the site on the identified lizard values.
- Provide recommendations on:
    - The necessary methods to avoid and minimise identified adverse effects, and
    - What compensation measures are required to address unmitigated (residual) adverse effects.

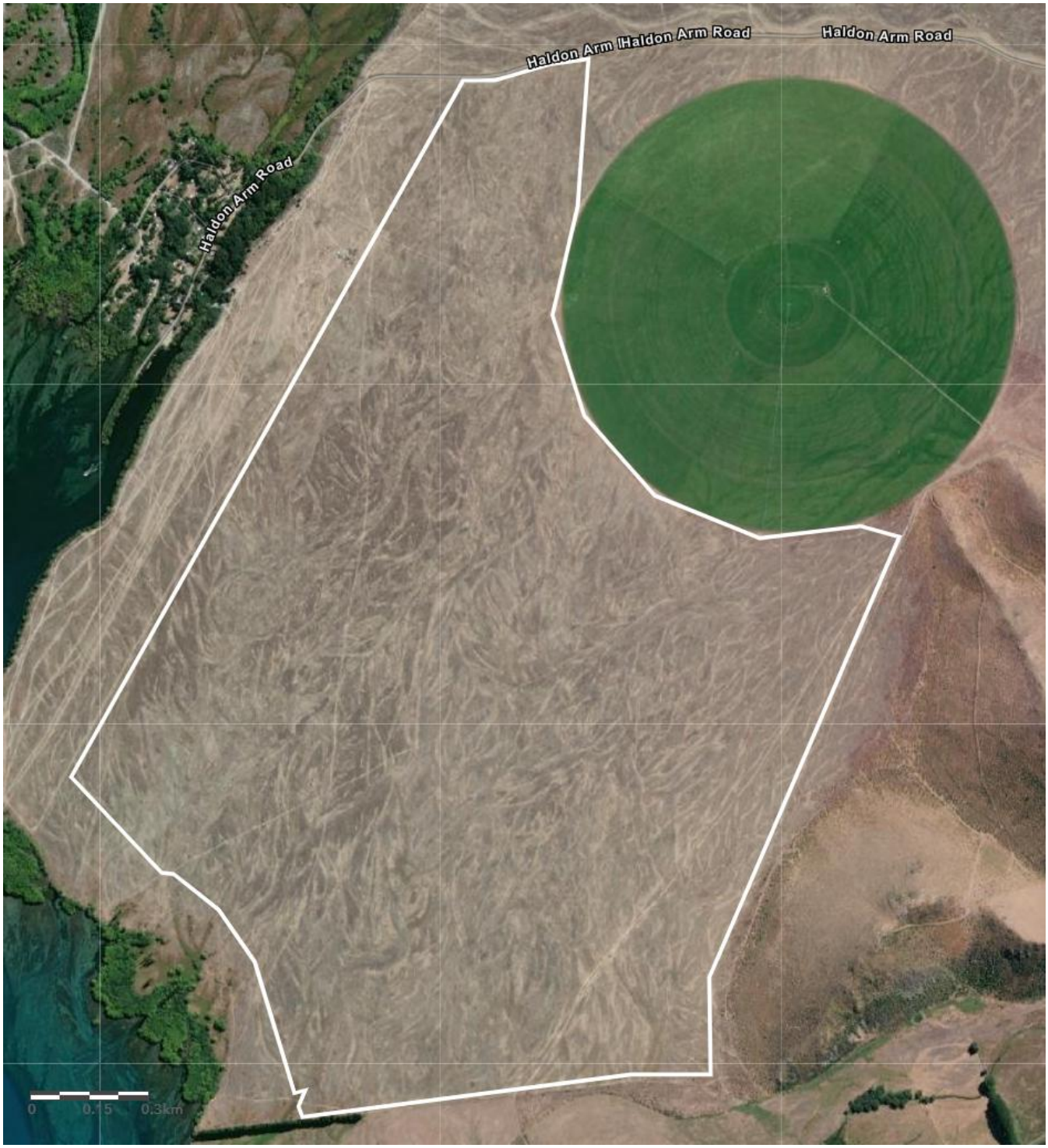


**Figure 1.** Site boundary (white line).

## 1.2 Project Description

A detailed description of the various elements making up the solar farm is set out in the Assessment of Environmental Effects (AEE) accompanying the resource consent application document. In summary, the development includes the following key components.

The proposed solar development will consist of arrays of photovoltaic panels and underground cabling connecting to a substation which in turn connects to the National Grid transmission line (**Figure 2**). The development area will be fenced with rabbit fencing and grazing of the development area by stock will cease. Solar arrays will have a maximum ground cover of approximately 40 % when panels are horizontal Solar array coverage is not continuous with a 16 ha clear central strip and smaller areas between arrays occurring throughout the site.

Installation of photovoltaic solar panels will involve insertion of steel piles for support frames and panel centres will be elevated 1.5 m above the ground surface (**Figure 3**). Panels will be located in linear arrays with a maximum ground coverage of 40% when panels are horizontal and less when inter array areas are included. The total area of disturbance from the proposed solar farm development is 13.19 ha (AgScience Ltd 2025).

The solar farm will operate year-round with minimal daily activity once commissioned. Routine operations include system monitoring, scheduled maintenance, vegetation control, and security inspections. Access is typically limited to light vehicles via internal access roads.

Groundcover within row spacing is maintained as pasture or mixed herb species cover to minimise erosion and dust. Vegetation is controlled through periodic/targeted mowing or grazing with sheep.

Ecological enhancement on site includes rabbit-proof fencing of 320 ha and allocating 26.55 ha of the site across five zones for conservation enhancement (**Figure 4**).

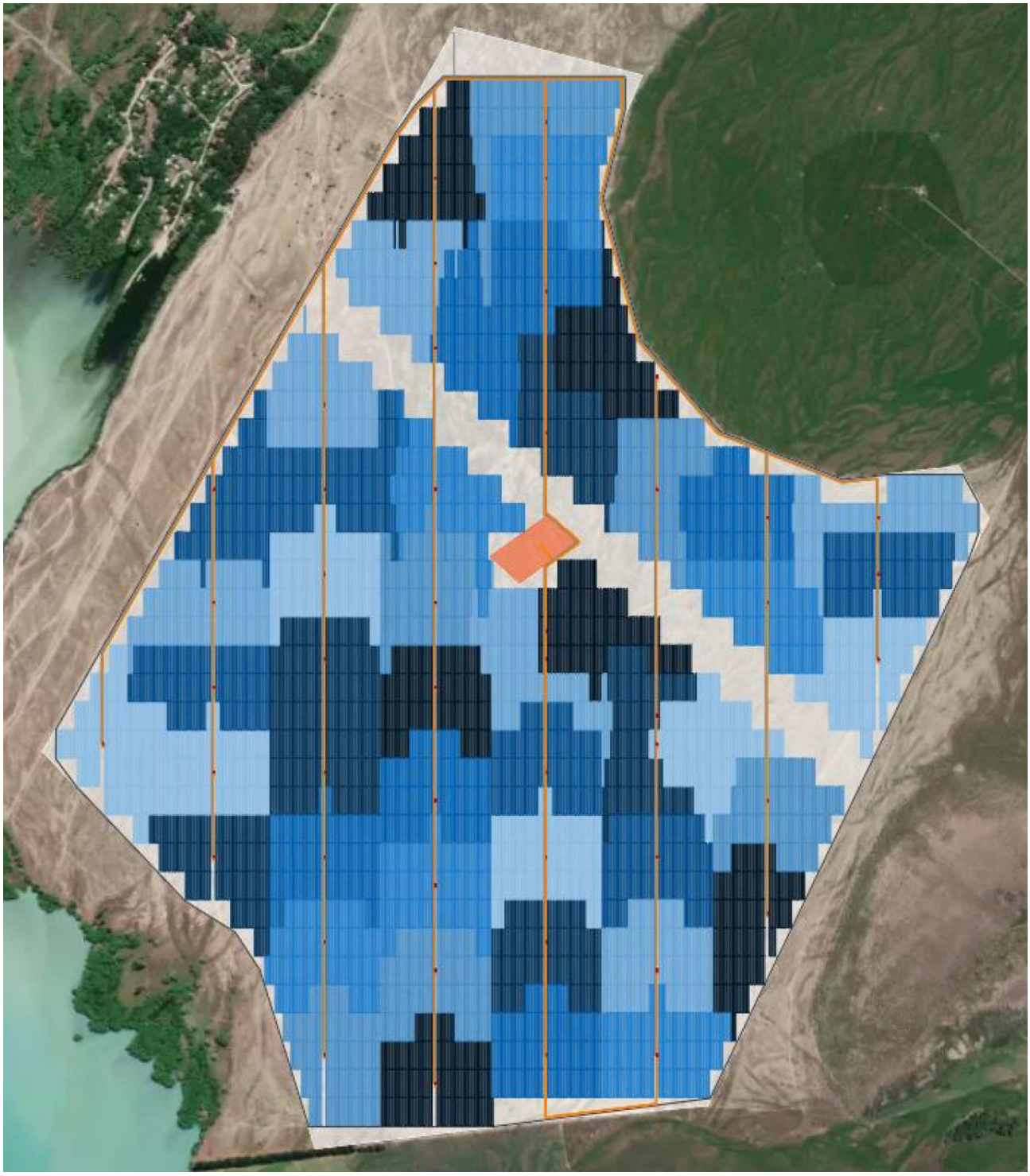

**Figure 2.** Solar farm infrastructure layout – solar panels (light and dark blue), s

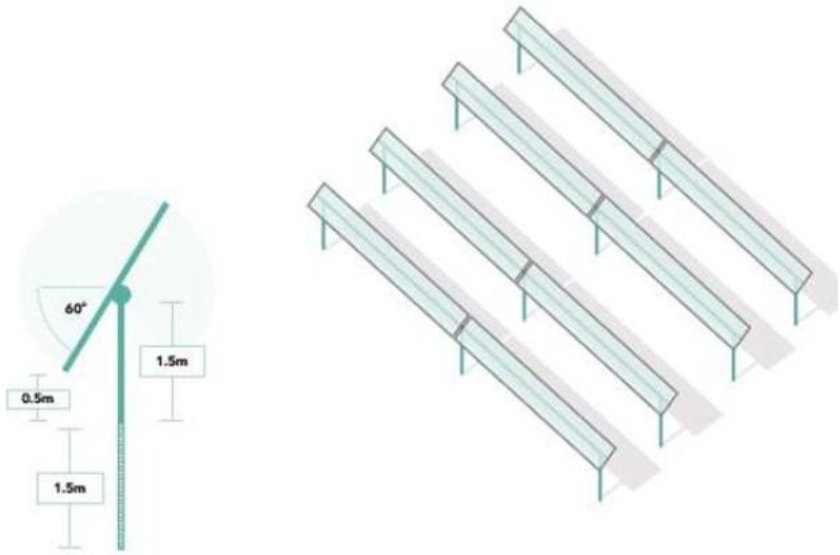


**Figure 3.** Solar panel array design.


**Figure 4.** Conservation zone areas across the site (green), site boundary (orange line).

# 2.0 Ecological Context and Site Description

The site is within the Pukaki Ecological District (Pukaki ED) in the Mackenzie Ecological Region. The Pukaki ED is characterised by dry outwash plains below 900 m above sea level (a.s.l.) between the Two Thumb and Benmore Ranges (McEwen 1987).

The existing (present day) vegetation reflects modification following human settlement. Following human settlement, particularly European pastoralism, the extent of scrub / low forest and tall tussock communities has been reduced, and the extent of short tussockland has increased as a result of an increased frequency of fire. Existing short tussock grasslands have been degraded by years of grazing by sheep and rabbits, and the introduction and spread of exotic plants (particularly grasses and mouse-ear hawkweed).

The Pukaki ED mainly comprises degraded fescue tussock grasslands with adventive sweet vernal (*Anthoxanthum odoratum*), browntop (*Agrostis capillaris*) and hawkweed (*Pilosella, Hieracium* spp.), some of which is oversown and converted to pasture.

The climate is semi-arid to humid inland, with cold winters and warm summers and average rainfall of less than 500 mm.

The site is situated within Haldon Station, on the eastern margin of Lake Benmore. The site is a flat, dry, rural environment at an altitude of 370 m asl. Haldon Station is a highly modified environment, with pivot-irrigated pasture the dominant landcover to the north of the site. The adjacent land use to the south and east of the site is predominantly low producing grassland.

A review of the relevant regional planning maps and Landcare Research land cover database revealed that the vegetation within the site is not legally protected by the Department of Conservation, QEII National Trust, Nature Heritage Fund Covenants, Regional Council or Nga Whenua Rahu, and there are no Significant Natural Areas within the site.

The site occurs on a Threatened Land Environment Classification location where > 30% of indigenous vegetation is left and < 10% is protected. In these environments, indigenous vegetation is reduced and fragmented, and poorly protected (Walker 2015).

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# 3.0 Desktop Assessment

The herpetofauna desktop assessment involved a review of existing information to determine which lizard species (and their habitats) were likely present over the MWF site. Department of Conservation Bioweb Herpetofauna Database records (August 2025) were reviewed to inform our assessment of the potential lizard species within the Project Envelope. Records within a 30 km radius were reviewed. Department of Conservation Bioweb Herpetofauna Database records show:

- No lizards within the site.
- Eight species of lizard within a 30 km radius, with the most common records including McCann's skink (*Oligosoma maccanni*), southern grass skink (*Oligosoma chionochloescens*), and Southern Alps gecko (*Woodworthia* "Southern Alps") (**Table 1**).

The records indicate that native lizards are relatively common within the landscape in areas with less modification, including tussock grassland, rocky river terraces, scree slopes and at higher altitude.

**Table 1.** Lizard species recorded in the DOC national herpetofauna database and likelihood occupying the application site.

| Scientific name | Common name | Threat Status (Hitchmough et al., 2026) | Ecology and habitat (New Zealand Herpetological Society) | Applicable habitat on site | Likelihood of occupying site |
|---|---|---|---|---|---|
| *Oligosoma lineoocellatum* | Canterbury spotted skink | Threatened - Nationally Endangered | Canterbury spotted skinks are avid-sunbaskers and bold in character, making them a particularly conspicuous species. They prefer open/sunny areas such as boulder beaches, sand dunes, and coastal scrub, as well as grassland, shrubland, rock piles, and scree slopes at inland sites. They are mainly terrestrial, but will also climb shrubs to forage for insects and berries above ground. When not basking or foraging, Canterbury spotted skinks will take refuge under coastal debris, rocks, logs, or in dense vegetation such as thick grass or flax (Phormium spp.). | Boulderfield. | Very low |
| *Oligosoma* aff. *longipes* "southern" | Southern long-toed skink | At Risk - Declining | Southern long-toed skinks are diurnal and strongly heliothermic, emerging from their rocky retreats to actively hunt when conditions are suitable. They are a saxicolous species spending the majority of their lives in and amongst the rocky habitats in alpine environments (screes, gravel or boulder talus slopes, dry streambeds, and rock piles amongst low growing vegetation. | Boulderfield. | Very low |
| *Oligosoma maccanni* | McCann's skink | Not Threatened | McCann's skinks are a diurnal, heliothermic species that can readily be seen sun-basking and hunting. This species typically occupies dry rocky environments from the lowlands up into subalpine regions. They readily inhabit rock tor systems, boulderfields, tallus, scree, rocky herbfield, exotic grasses, herbfield, and tussockland. | Small patches of sweet brier with long grass.<br>Rock piles. | Confirmed |
| *Oligosoma chionochloescens* | Southern grass skink | At Risk - Declining | Southern grass skinks are a very frequently seen species because they are diurnal, avid sun-baskers, and terrestrial. This species has been recorded in densities as high as 4000 per hectare (Wilson et al. 2017). Southern grass skinks inhabit a range of habitats including coastal dune habitat, wetlands, grassland, shrublands, rocky shrubland/herbfield, screes, tussock, stony river beds and even cities. | Small patches of sweet brier with long grass.<br>Boulderfield. | Confirmed |
| *Oligosoma prasinum* | Mackenzie skink | Threatened - Nationally Vulnerable | Mackenzie skinks are diurnal, terrestrial, and avid-sunbaskers making them a particularly conspicuous species. They prefer open/sunny areas such as open grassy areas, tussock grassland, rock piles, and scree slopes. When not basking or foraging, Mackenzie skinks will take refuge under rocks, logs, or in dense vegetation such as thick grass and complex shrubs. | Small patches of sweet brier with long grass.<br>Boulderfield. | Very low |
| *Oligosoma* aff. laxa "alpine rock northern" | Central Canterbury alpine rock skink | Threatened - Nationally Critical | Central Canterbury alpine rock skink are diurnal, saxicolous, and avidly heliothermic. They are renowned for being highly active and mobile, with a maximum recorded home range size of 950 metres squared (Lettink and Monks, 2019). Central Canterbury alpine rock skink occur in both the lowlands | Boulderfield. | Very low |

| Scientific name | Common name | Threat Status (Hitchmough et al., 2026) | Ecology and habitat (New Zealand Herpetological Society) | Applicable habitat on site | Likelihood of occupying site |
|---|---|---|---|---|---|
| | | | and subalpine environments. They typically inhabit dry rocky areas with suitable refugia (their large size renders them more vulnerable to predators). These include boulderfields, screes, tallus, stoney river terraces and banks, rocky shrubland, and rocky bluffs. | | |
| *Naultinus gemmeus* | Jewelled gecko | At Risk - Declining | Jewelled geckos are an arboreal or terrestrial species which can be sighted basking in the foliage of tussocks, shrubs, vines, or trees. They typically inhabit indigenous forests, shrublands, and tussock grasslands. Primary habitats include beech forest, podocarp forest, tussock grassland, and structurally-complex shrublands and vinelands ( particularly manuka, kanuka, small-leaved Coprosma sp., Muehlenbeckia spp. totara, and matagouri). Inland high-altitude populations (e.g. Lammermoor Range, Ida Range, and high-altitude parts of the Mackenzie Basin) are more terrestrial in nature with narrow-leaved snow tussock being the most frequented vegetation and most individuals being sighted <0.5 metres above the ground. | Nil | Nil |
| *Woodworthia* "Southern Alps" | Southern Alps gecko | At Risk - Declining | Generally nocturnal but occasionally seen basking in daylight. Primarily terrestrial and saxicolous (rock-dwelling) although some populations are known to be arboreal. Southern Alps geckos live at lower elevations between mountain ranges, but also range up into the alpine (1800 metres a.s.l). Can be found in the stable bases of scree slopes, rocky river terraces and shattered outcrops in dry sub-alpine. Known to inhabit rocks like greywacke and schist. | Small patches of sweet brier with long grass. Boulderfield. | Very low |

# 4.0 Lizard Habitats

The site is characterised by a ground cover of bare soil, stones and a dominant cover of introduced plants including mouse-ear hawkweed (*Hieracium pilosella*) and chewing's fescue (*Festuca rubra*). Small patches of sweet brier are scattered across the site, and where this vegetation provides shading and shelter from wind erosion, a groundcover of chewings fescue and ripgut brome (*Bromus diandrus*) becomes more well-developed (**Figure 4**). These small patches of vegetation provide the necessary cover and refuge for smaller skink species. In addition to the small patches of sweet brier, there is a boulderfield at the southern portion of the site that provides habitat for lizards. Otherwise, the bare soil, embedded rocks, and mouse-ear hawkweed dominant areas that make up the vast majority of the site lack the necessary environmental conditions for lizards to persist. Farm practices such as top dressing, tilling, and attempts to convert the land to pasture has been highly destructive to the ecosystem, with rocks, debris and long vegetation largely being cleared, and in turn habitat for lizards.

The total area of potential lizard habitat within the site was approximately 4.35 ha (43,583 $m^2$) of which 2.43 ha (24,299 $m^2$) is within the proposed solar farm development footprint. The average size of each lizard habitat fragment was 558 $m^2$ (24 m x 24 m) which is negligible in scale. Due to the accuracy of our GPS (+/- 5 m), and the poor quality of aerial imagery, the boundaries shown in **Figure 5** are based on professional judgement and should be considered as indicative.

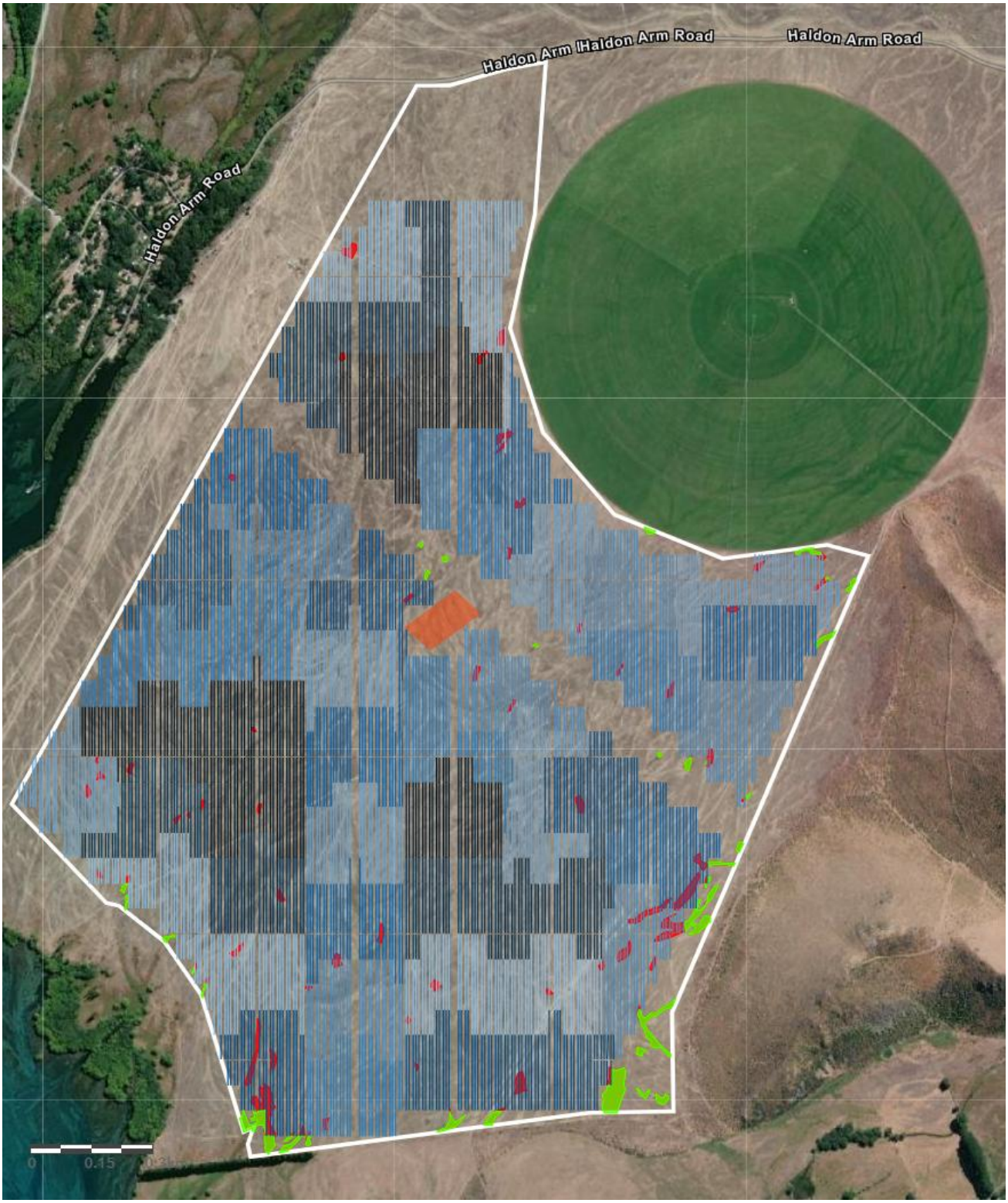


**Figure 5.** Proposed development footprint (blue, black and orange), potential lizard habitat within proposed development footprint (red), potential lizard habitat outside of proposed development footprint (green).

**Plate 1.** The typical hieracium dominant low-growing vegetation across the site with minor sporadic patches of sweet brier. Photograph taken at the northern end of the site facing west.

**Plate 2.** Another example of the typical vegetation across the site. Photograph taken at the centre of the site facing west.

**Plate 3.** A complete lack of cover for lizards within the hieracium dominant vegetation means that they cannot persist in this environment.

**Plate 4.** A patch of sweet brier with more developed grass ground cover.

P**late 5.** ACOs and pitfall traps set within a patch of sweet brier.

**Plate 6.** A boulderfield within the site.

# 5.0 Lizard Survey Methodology

Potential lizard habitat types were assessed within the site via a comprehensive lizard survey by Mr Tony Payne. Mr Payne is recognised by the Department of Conservation as a qualified herpetologist through his work across New Zealand. For the Pukaki Ecological District, he holds the relevant regional survey permit issued by the Department under the Wildlife Act, which authorises him to survey native lizards (including capturing and handling lizards). Mr Paynes credentials are provided in **Appendix A**.

An initial scoping survey was undertaken on 20 November 2025, which included assessing the quality and extent of potential lizard habitats within the site. Based on the available habitats a variety of detection methods were decided on by Payne. The goal was to maximise encounters of all potential lizard species and effectively sample potential lizard habitats present.

Good practice lizard surveying was undertaken following DOC's herpetofauna protocols. For skinks, the most common method for open habitats (e.g., grassland, scrub margins) is using an artificial cover object (ACO) and a pitfall trap and/or Gee's minnow trap, and for rocky environments a Manual Habitat Search (MHS) or Visual Encounter Survey (VES). A summary for each lizard survey method undertaken is provided in **Table 2** and habitat types sampled is provided in **Table 3**.

**Table 2.** Timetable for lizard survey

| Method | Date Set / Survey | Effort | Date of checks |
|---|---|---|---|
| ACOs | 20-21 Nov 2025 | 130 triple-stacked | 27-29 Jan 26 |
| Pitfall traps | 20-21 Nov 2025 | 54 4L buckets | 28-29 Jan 26 |
| VES/MHS | 20-21 Nov 2025, 27-29 Jan 26 | c. 6 search hours | - |

ACOs were used at 26 focal sites across the site. These sites had low to moderate vegetation cover and provided sunny basking locations for any skinks residing. In total, 130 triple-stacked ACOs were set in clusters of 5 at 3 m to 5 m spacings in accordance with the DOC herpetofauna protocols (DOCDM-797638). The size of clusters was undertaken to enable a measure of relative abundance and density for each monitoring transect using the catch-per-unit-effort (CPUE) indices from a mark-recapture survey.

A total of 54 pitfall traps were used at 18 focal sites in clusters of 3 supplementing ACO sampling locations in accordance with the DOC herpetofauna protocols (DOCDM-760240). Traps were open for two consecutive days. Each pitfall trap was baited with canned pear, had a moist, clean sponge, and leaf-litter for cover and to minimise stress.

All devices were left on site for 9 weeks.

A total of 54 areas were searched via VES/MHS **(Figure 7**). Searches included walking through the site and searching for active lizards and lifting any cover present in search for lizards and/or their sign beneath and on top of cover. Faecal sign was noted (where present) on top of any cover present (e.g., rocks) and way pointed, as well as detections of lizards themselves.

The lizard survey was started at approximately 8 am each morning and undertaken during days with no rain, calm to light wind, and daytime temperatures ranging from 10°C to 20°C (**Table 4**). The variation of cooler mornings, and warm afternoons experienced throughout the survey provided ideal conditions for lizard activity and the chances of detecting lizards in either an ACO or pitfall trap.

**Table 3.** Habitat treatment sampled by ACOs and pitfall traps

| Label | Treatment | Pitfall trap | X | Y |
|---|---|---|---|---|
| 1 | Minor sweet brier patches, open ground cover environment | No | 170.2444 | -44.3514 |
| 2 | Minor sweet brier patches, open rocky environment | No | 170.2367 | -44.3481 |
| 3 | Minor sweet brier patches, open rocky environment | No | 170.2363 | -44.3461 |
| 4 | Minor sweet brier patches, grass ground cover | Yes | 170.2315 | -44.3443 |
| 5 | Minor sweet brier patches, open ground cover environment | Yes | 170.2315 | -44.3466 |
| 6 | Minor sweet brier patches, open rocky environment | No | 170.2341 | -44.3507 |
| 7 | Minor sweet brier patches, open ground cover environment | Yes | 170.2367 | -44.351 |
| 8 | Minor sweet brier patches, grass ground cover | Yes | 170.239 | -44.3525 |
| 9 | Minor sweet brier patches, grass ground cover | Yes | 170.2433 | -44.3554 |
| 10 | Minor sweet brier patches, open rock environment | No | 170.2414 | -44.3554 |
| 11 | Minor sweet brier patches, open rocky environment | No | 170.2379 | -44.353 |
| 12 | Minor sweet brier patches, grass ground cover | Yes | 170.2358 | -44.3536 |
| 13 | Minor sweet brier patches, grass ground cover | Yes | 170.2398 | -44.3564 |
| 14 | Moderate sweet brier patches, grass ground cover | Yes | 170.2425 | -44.3584 |
| 15 | Moderate sweet brier patches, open ground cover | Yes | 170.2382 | -44.3607 |
| 16 | Minor sweet brier patches, open ground cover environment | Yes | 170.229 | -44.355 |
| 17 | Minor sweet brier patches, open ground cover environment | Yes | 170.2251 | -44.3557 |
| 18 | Minor sweet brier patches, open rocky environment | Yes | 170.2234 | -44.3562 |
| 19 | Minor sweet brier patches, open ground cover environment | Yes | 170.2294 | -44.3582 |
| 20 | Minor sweet brier patches, open ground cover environment | Yes | 170.2316 | -44.36 |
| 21 | Minor sweet brier patches, grass ground cover | Yes | 170.2338 | -44.3624 |
| 22 | Moderate sweet brier patches, grass ground cover | No | 170.2294 | -44.3621 |
| 23 | Minor sweet brier patches, grass ground cover | Yes | 170.2274 | -44.3606 |
| 24 | Minor sweet brier patches, open ground cover environment | No | 170.224 | -44.358 |
| 25 | Moderate sweet brier patches, grass ground cover | Yes | 170.2287 | -44.3624 |
| 26 | Moderate sweet brier patches, grass ground cover | Yes | 170.2295 | -44.3639 |

**Table 4.** Weather conditions during device checks

| Date | Time | Temp (°C) | Overhead conditions | Ground conditions | Wind |
|---|---|---|---|---|---|
| 27 Jan 26 | 8:10am to 12:30pm | 12-14 | Sunny | Damp (recent rain) to dry | Calm to light |
| 28 Jan 26 | 7:45am to 12:10pm | 10-18 | Partly cloudy | Dry | Calm to light |
| 29Jan 26 | 7:45am to 12:50pm | 16-20 | Overcast to sunny | Dry | Calm to light |

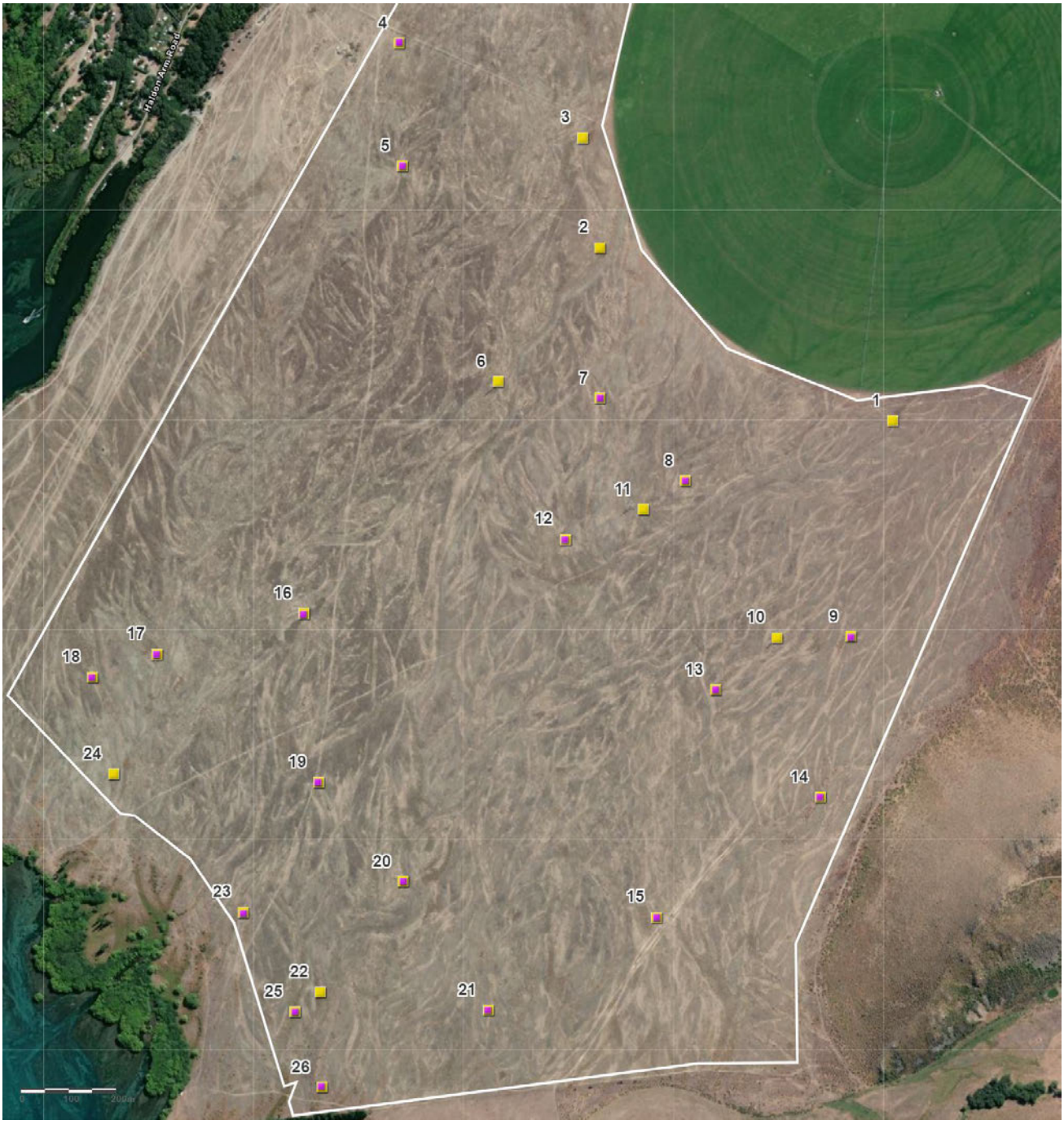


**Figure 6.** ACO cluster (yellow square), pitfall trap cluster (purple square), site boundary (white line).

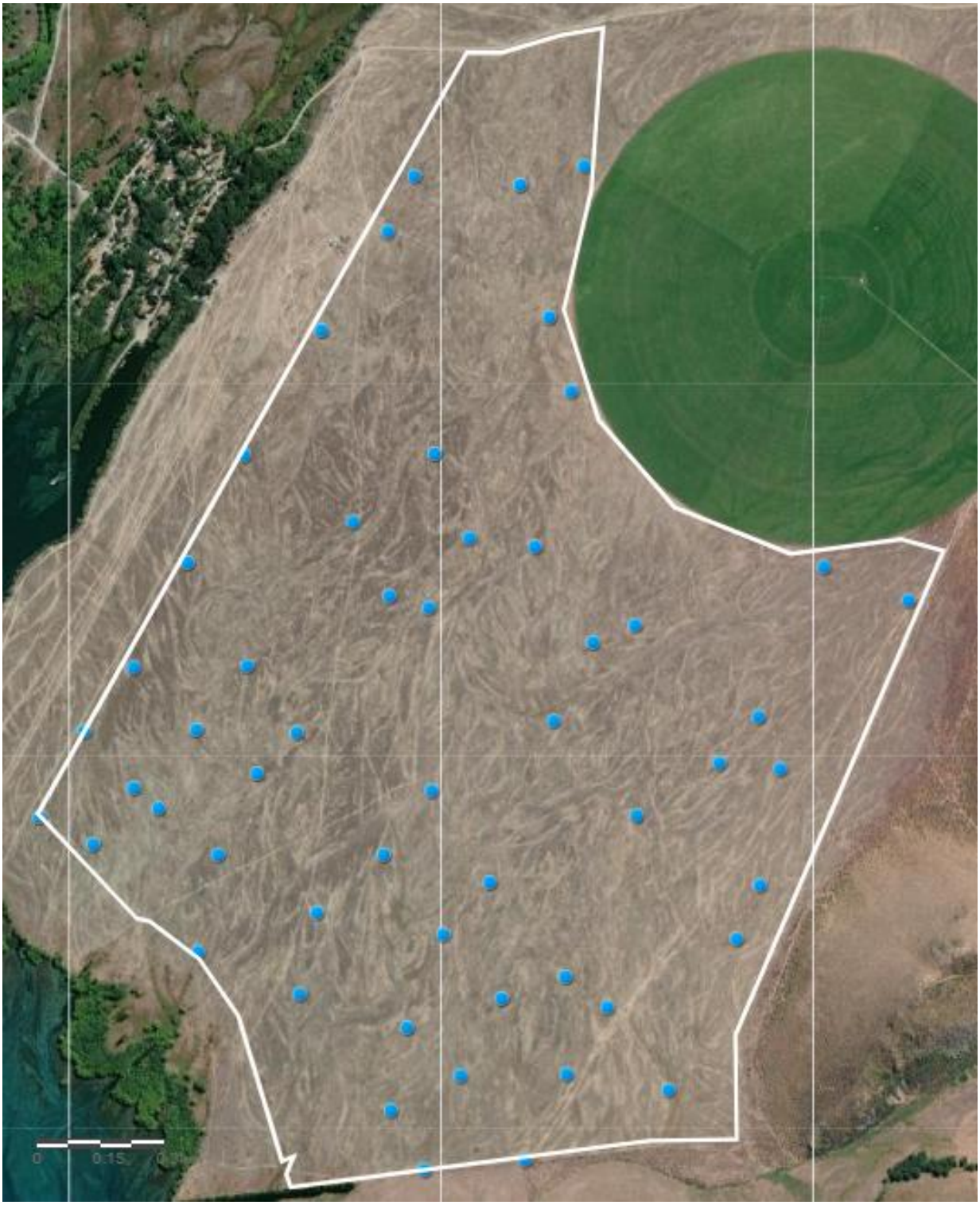

**Figure 7.** Manual searching and Visual Encounter Survey (VES) location (blue dot), site boundary (white line).

# 6.0 Lizard Survey Results

A total of 65 lizards were recorded during the survey including 35 McCann's skinks, 3 southern grass skink, and 27 unidentified skink species. In addition, 10 lizards were recaptured over successive days. Unidentified skinks were animals not physically captured. We assume that the majority of these were McCann's skink based on rapid observations of greyer colours and checkerboard-like patterning on their dorsal surface, and at least one animal appeared to be a southern grass skink based on browner colours. Given the visual similarities between McCann's skink and southern grass skink, we are cautious to definitively differentiate all lizards that were not captured.

56 lizards were recorded from ACOs, 17 lizards from pitfall traps, and 2 lizards from VES/MHS.

Where lizards were present, ACOs had an average Catch Per Unit Effort (CPUE) of 19% and a maximum of 46% at Site 18, where 7 skinks were recorded from 15 checks. In addition, pitfall trap sites had an average CPUE of 28% and a maximum of 67% at Site 25 where 4 skinks were recorded from 6 checks. Lizards were recorded at one of the VES/MHS sites with a total of two McCann's skink (assumed from rapid sighting) basking within a boulderfield (**Plate 6**).

McCann's skink were recorded at device clusters 3, 4, 9, 10, 12, 13, 15 to18 and 21 to 26, across all habitat treatments sampled. Southern grass skink were recorded at device clusters 9, 12 and 25 where there was grass cover. No lizards were recorded from device clusters 1,2, 5 to 8, 11, 19 and 20 which were predominantly open ground cover environments around small patches of sweet brier.

The survey results reflected the general understanding of both McCann's skink and southern grass skink abundance, habitat preferences, and occupancy relative to the works footprint. In general, McCann's skinks tend to be common and widespread over the Mackenzie Region and can persist even at the most degraded sites, and southern grass skink are less frequently encountered and restricted more to denser vegetation. As expected, no lizards were recorded within bare soil and mouse-ear hawkweed.

The results indicate that any other rarer potential lizard species known to the Ecological District such as Canterbury spotted skink, southern long-toed skink, Mackenzie skink, Central Canterbury alpine rock skink, jewelled gecko and Southern Alps gecko are highly unlikely to be present within the site or their populations are below detection levels. This result is likely to due to the presence of predators, existing fragmentation of habitats, and where reasonable vegetation cover or rock areas are present, these areas have been highly degraded by historic and current land use.

The results have been interpreted to assess habitat quality based on the abundance of lizards (CPUE) recorded as well as inferring results from other methods within close proximity to each other, and overall field observations. This is an assessment based on professional judgement where the results were considered in accordance with Appendix 3 of the Canterbury Regional Policy Statement 2013 and National Policy Statement for Biodiversity (amended 2025) and the Environment Institute of Australia and New Zealand (EIANZ) Ecological Impact Assessment guidelines (Roper-Lindsay, *et al.* 2018) (hereinafter referred to as the EIANZ Guidelines) as follows:

- Representativeness: Indigenous vegetation or habitat of indigenous fauna that is representative, typical or characteristic of the natural diversity of the relevant ecological district.

- Rarity / distinctiveness: Habitat of indigenous lizards that is threatened, at risk, or uncommon, nationally or within the relevant ecological district or an indigenous lizard species at its distribution limit within Canterbury Region or nationally.
- Diversity and pattern: habitat of indigenous lizards that contains a high diversity of indigenous ecosystem or habitat types, indigenous taxa, or has changes in species composition reflecting the existence of diverse natural features or ecological gradients.
- Ecological context: habitat of indigenous lizards that provides or contributes to an important ecological linkage or network, or provides an important buffering function

Habitat quality categories are as follows:

1. No habitat. Where there is insufficient cover and regular disturbance from farming resulting in conditions where lizards are unable to persist. This includes highly modified bare soil, embedded rocks with predominantly mouse-ear hawkweed dominant areas.
2. Low quality habitats are those that are small in scale (<1,000 $m^2$) where only Not Threatened species were recorded at a relatively low abundance (e.g., a ≤30% CPUE). Approximately 1.8 ha (17,973 $m^2$) of low quality habitat is within the site, of which 1.06 ha (10,639 $m^2$) would be modified by the proposed development footprint.
3. Medium quality habitats are those that are moderate in scale (>1,000 $m^2$) or recorded any At Risk species, or Not Threatened species at a relatively high abundance (e.g., a >30% CPUE). Approximately 2.56 ha (25,610 $m^2$) of medium quality habitat is within the site, of which 1.37 ha (13,660 $m^2$) would be modified by the proposed development footprint.
4. High-quality habitats are those that recorded any Threatened species, or At Risk species at a relatively high abundance (e.g., a >30% CPUE). There is no high-quality habitat within site.

The survey indicates that the best habitats for lizards are larger areas of sweet brier patches with a higher density of grass ground cover.

**Plate 7.** A southern grass skink recorded on site.

**Plate 8.** A McCann's skink recorded on site.

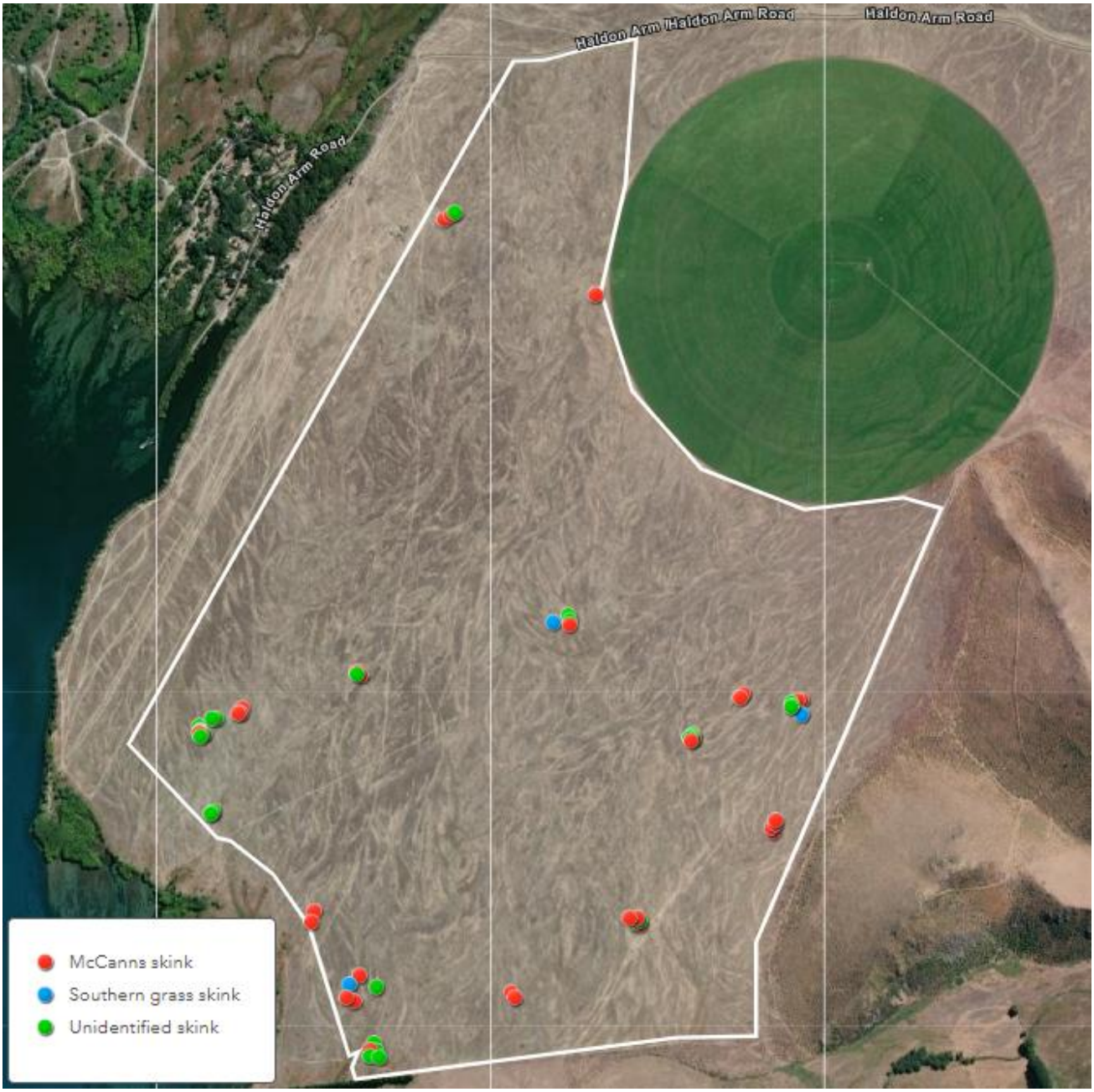


**Figure 8.** Lizard records across the site.

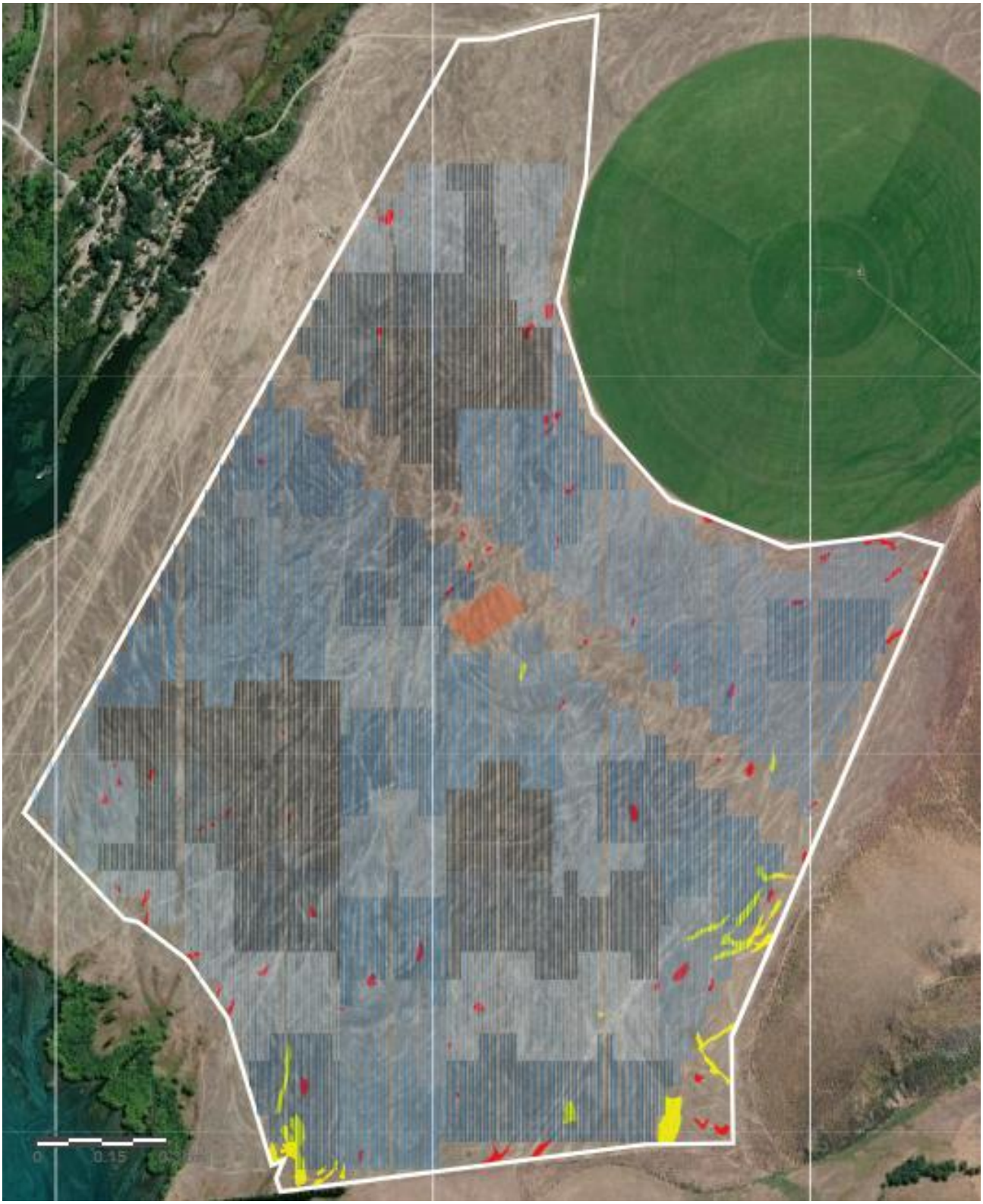

**Figure 9.** Proposed development footprint (blue, black and orange), low quality lizard habitat (red), medium quality lizard habitat (yellow), site boundary (white).

# 7.0 Assessment of Effects

This assessment of ecological effects follows the guidelines published by the Environment Institute of Australia and New Zealand (Roper-Lindsay et al., 2018) (EIANZ guidelines).

The EIANZ matrix approach, and the guidelines within which it is included, has been developed as a guide for ecologists undertaking effects assessments under the RMA. The EIANZ guidelines and the impact assessment matrix in particular, provides a robust, concise and consistent approach to effects assessment, whilst ensuring that individual expert evaluation and opinion is preserved.

The level of ecological effect is based on combining the ecological value of a feature that is actually or potentially impacted by the proposed activity and the magnitude of the effect as per **Table 6**.

The assessment methodology is provided in **Appendix C**.

**Table 5.** Criteria for describing level of effects from the EIANZ guidelines.

| **Magnitude** | **Ecological value** | | | | |
|---|---|---|---|---|---|
| | **Very high** | **High** | **Moderate** | **Low** | **Negligible** |
| **Very high** | Very high | Very high | High | Moderate | Low |
| **High** | Very high | Very high | Moderate | Low | Very low |
| **Moderate** | High | High | Moderate | Low | Very low |
| **Low** | Moderate | Low | Low | Very low | Very low |
| **Negligible** | Low | Very low | Very low | Very low | Very low |
| **Positive** | Net gain | Net gain | Net gain | Net gain | Net gain |

The effects assessment in this section of the report follows the steps in the effects management hierarchy. These steps identify the expected residual level of adverse effects on lizards and their habitats following the LEL's proposals to avoid, minimise and remedy the Project's adverse effects. If following this exercise, residual effects are considered more than minor, the steps also require identification of whether these residual effects can be redressed through a biodiversity offset, and if not, whether environmental compensation is required.

## 7.1 EIANZ Effects Assessment

Southern skink is classified as At Risk and is of High ecological value. In contrast, McCann's skink is classified as Not threatened, ubiquitous across the Mackenzie Region, and of Low ecological value.

Actual and potential adverse effects to lizards after all avoidance measures have been considered include the injury/ death of animals during the construction of the solar farm resulting in a short-term reduction in the local populations.

In terms of lizard habitat values affected by the proposed development layout, over 99% of the site avoids suitable lizard habitat and there is a total of:

- 1.06 ha of low value habitat; and
- 1.37 ha of moderate value habitat.

Within the Pukaki Ecological District within there is c. 22,000 ha area within the surrounding Tekapo River outwash gravels that have similar ecological conditions to the site. If the same proportion of this area was to have suitable lizard habitat as per the site (i.e., 0.75%), taking into consideration altitude, aspect, topography, land environment, and expected vegetation cover, it is estimated that there is a total of 16,500 ha of suitable lizard habitat within the local environment (**Figure 10**).

Works within c. 2.4 ha of lizard habitat (of low and moderate value) at the local scale, is considered to be of a magnitude that is 'Negligible' i.e., the amount of clearance relative to 1,650 ha of lizard habitat within the local area is very, very small and inconsequential.

*"Very slight change from the existing baseline condition. Change barely distinguishable, approximating to the 'no change' situation; AND/OR having negligible effect on the known population or range of the element/feature"*

This extent of lizard habitat relative to what is present within the local environment and Ecological District is important to understand the magnitude of an effect. The magnitude of an effect is related to the scale of comparison and temporal persistence of the effect. The scale is often related to the scale at which the values of an area are considered, which can be national (such as a threat classification), Regional – as in a regionally uncommon species or ecosystems, or an Ecological District. A consideration at only an individual site level is unusual, not typically relevant and not intended by the EIANZ (2018) guide or Resource Management Act (1991) (RMA).

For this project, there is a considerable net-gain in lizard habitat values. This is because the change in land use is expected to cause a significant increase in vegetation cover from rabbit-proof fencing as well as the shading from the panels creating a microclimatic effect that increases humidity and soil moisture (Payne and Norton 2011). This is expected to result in greater vegetation cover as habitat for McCann's skink and southern grass skink as well as an increase in invertebrates as a key food source for these species. Both species are expected to spread and establish across the site in otherwise bare soil and mouse-ear hawkweed dominant areas that currently do not provide habitat. At the site's 320 ha scale, meaningful change in lizard values are predicted to occur and the higher value southern grass skink is expected to particularly benefit from an increase in vegetation cover.

The temporary loss of habitat during construction will contribute to a shot to medium term decline in the site lizard habitats, and in order to ensure there is no-net-loss and biodiversity is maintained, ecological redress of habitat enhancement and creation should be undertaken at a ratio of at least 1:1.

The proposed 26.55 ha area proposed for conservation enhancement across the five areas on site guarantee a 1:10 increase in habitat value over the long-term.

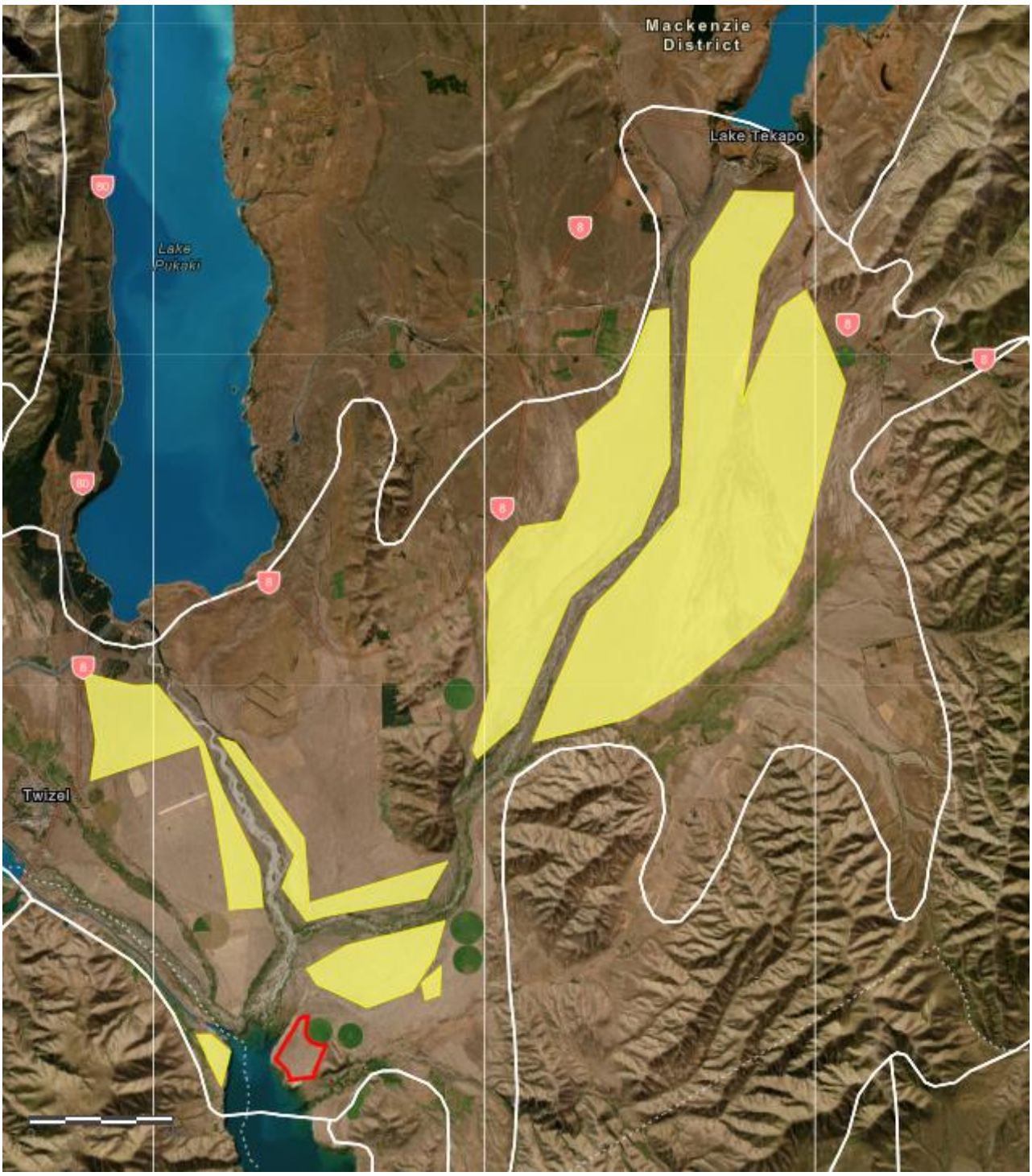


**Figure 10.** The site (red), similar environment to the site within Pukaki Ecological District (yellow), Ecological Districts (white lines).

## 7.2 Management of Effects

Approximately 99% of the proposed development area provides no habitat for lizards and the layout avoids most of the moderate value habitats on site (**Figure 9**). LEL has advised that the proposed development footprint encompass all areas and values for lizards that can be avoided to the extent feasible.

Actual and potential adverse effects to lizards after all avoidance measures have been considered include the injury/ death of animals during the construction of the solar farm.

To minimise adverse effects to lizards during construction, a Lizard Management Plan (LMP) should be prepared following good practice guidance (DOC 2019)[1]. In summary, we recommend that the LMP includes at a minimum:

- Deploying a 200 ACOs and 100 pitfall traps within the best habitats for lizards and checking these a minimum of five times (1,500 checks).
- Salvaging lizards from the boulderfield on site via manual searching.
- Relocating salvaged lizards to Zone 1.
- Enhancing a 2.5 ha area of Conservation Zone 1 with no less than 500 native plants that provide lizard habitat as per **Table 6** and 30 3x3m rock stacks using a mix of smaller and larger cobbles (e.g. 50-100 mm diameter).
- Undertaking a predator control programme across a 2.5 ha area to assist in the survival of relocated lizards for a minimum of five years using toxic baits applied in bait stations at 50 m spacings and DOC200 traps at 200 m spacings.
- Undertaking a post-release monitoring programme to determine population survivorship as follows:
    - Deploying 50 triple-stacked ACO's in a 10 x 10 m grid within Conservation Zone 1 (treatment) and Conservation Zone 3 (control). ACO's should be left for eight weeks and then checked once during suitable conditions. ACO's should be retrieved at the end of monitoring and redeployed each year.
    - One pre-release monitoring prior to lizards to be salvaged.
    - One annual monitoring check for three years post-lizard salvage.

**Table 6.** Recommended plant species list for ecological enhancement planting.

| Species | Common name | Proportion |
|---|---|---|
| *Chionochloa rubra* | Red Tussock | 20 % |
| *Chionochloa macra* | Mackenzie Tussock | 10 % |
| *Festuca novae-zelandiae* | New Zealand Fescue | 20 % |
| *Poa cita* | Silver Tussock | 20 % |
| *Poa colensoi* | Bluegrass Tussock | 20 % |
| *Helichrysum simpsonii* | | 10 % |

[1] Department of Conservation Lizard Technical Advisory Group. 2019. Key principles for lizard salvage and transfer in New Zealand. Department of Conservation, Wellington. 19 p

This management approach will ensure that the vast majority of lizards are relocated, and any residual effects associated with lizard injury/ death during construction of the solar farm will be Negligible.

To result in a no-net-loss in values for lizards, and in this instance a net-gain, the temporary loss of c. 2.4 ha of low to moderate quality habitat would be redressed by creating 26.55 ha of habitat within the five Conservation Zones within the site (**Figure 4**). Over time, management through rabbit-proof fencing is expected to subsequently result in an increase in vegetation cover providing excellent habitat for lizards that remedy the effects of the loss of habitat at a 1:10 ratio such that there is a long-term positive effect with regards to lizard habitat values.

# 8.0 Conclusion

The proposed changes in land use on site will result in a significant increase in lizard habitat that greatly exceeds the temporary adverse effects associated with the disturbance and loss of lizard habitat values within the 2.4 ha of lizard habitat within the proposed solar farm development footprint.

Following the implementation of a Lizard Management Plan, the actual and potential adverse effects on lizards will be positive through an increase in extent and quality of lizard habitats.

The following action is recommended to ensure that potential adverse ecological effects to lizards from the proposed solar farm development are minimised (mitigated) to the extent practicably feasible. These initiatives should be incorporated as a consent condition or advice notes, and evidence provided to Council that these mitigations have been duly incorporated:

- The Consent Holder must engage a suitably qualified and experienced practitioner in herpetofauna to develop a Lizard Management Plan with the objective to avoid, remedy, or mitigate for the potential adverse effects, and where required, offset and compensate for residual adverse effects, of the construction and operation of the Project on herpetofauna.

# 9.0 References

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Report prepared by:

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**Tony Payne**

Principal Ecologist

Blueprint Ecology Ltd

# Appendix A: Credentials

All lizard handling was carried out under the Wildlife Act authority 1184641-FAU.

Mr Payne has over 10-years direct experience surveying native lizards from Northland to Otago. Sectors include windfarms, solar farms, national highways, quarries, and subdivisions and has included large scale lizard survey designs, development of lizard salvage programs, monitoring, mitigation habitat design and specific predator control plans. He has surveyed over 2,000 native lizards of 19 different species, including the common potential species within the proposed development area.

- Qualifications: BSc (Hons) (Biological Sciences) University of Canterbury.
- Affiliations/ membership; EIANZ, SRARNZ, Nelson Botanical Society

Current and Previous Wildlife Act Authorities held:

Auckland salvage: 62230-FAU, 66672-FAU, 70820-FAU.

Wellington salvage: 81670-FAU, 91371-FAU, 93616-FAU, 102442-FAU, 111140-FAU, 117207-FAU, 117925-FAU, 120108-FAU.

Wellington/ Nelson survey: 91417-FAU, 107412-FAU.

Nelson salvage: 118355-FAU

Waikato survey: 117601-FAU.

Canterbury salvage: 98153-FAU.

National survey: 118461-FAU.

# Appendix B: Lizard Survey Raw Data

**Table B1.** Lizard survey raw data

| Date/ Time | Species | Age class | Weight (g) | SVL (mm) | Original tail (mm) | Regen tail (mm) | Device cluster | Lizard description | Notes |
|---|---|---|---|---|---|---|---|---|---|
| 1/27/2026 8:31 | McCanns skink | Sub-adult | 1.4 | 44 | 28 | 16 | 3 | Lizard 1 | |
| 1/27/2026 8:43 | McCanns skink | Adult | 4.1 | 57 | 67 | | 4 | Lizard 2 | |
| 1/27/2026 8:54 | Unidentified skink | Adult | | | | | 4 | | beneath ACO not captured |
| 1/27/2026 9:27 | McCanns skink | Adult | 2.6 | 48 | 60 | | 10 | Lizard 3 | |
| 1/27/2026 9:44 | Unidentified skink | Adult | | | | | 9 | | basking not captured |
| 1/27/2026 9:49 | Unidentified skink | Adult | | | | | 9 | | basking not captured |
| 1/27/2026 9:54 | McCanns Skink | Adult | 4 | 58 | 4 | 30 | 14 | Lizard 4 | |
| 1/27/2026 10:06 | McCanns Skink | Adult | 3.4 | 54 | 65 | | 14 | Lizard 5 | |
| 1/27/2026 10:13 | McCanns Skink | Adult | 2.5 | 46 | 55 | | 14 | Lizard 6 | |
| 1/27/2026 10:24 | Unidentified skink | Adult | | | | | 13 | | beneath ACO not captured |
| 1/27/2026 10:26 | Unidentified skink | Sub-adult | | | | | 13 | | basking not captured |
| 1/27/2026 10:28 | Unidentified skink | Sub-adult | | | | | 13 | | basking not captured |
| 1/27/2026 10:29 | Unidentified skink | Juvenile | | | | | 13 | | beneath ACO not captured |
| 1/27/2026 10:37 | Unidentified skink | Adult | | | | | 12 | | beneath ACO not captured |
| 1/27/2026 10:39 | Unidentified skink | Adult | | | | | 12 | | basking not captured |
| 1/27/2026 10:51 | McCanns skink | Adult | 3 | 47 | 62 | | 16 | Lizard 7 | |
| 1/27/2026 10:59 | Unidentified skink | Adult | | | | | 16 | | beneath ACO not captured |
| 1/27/2026 11:16 | Unidentified skink | Adult | | | | | | | basking not captured. Observed in rockpile |
| 1/27/2026 11:18 | Unidentified skink | Adult | | | | | | | basking not captured. Observed in rockpile |
| 1/27/2026 11:23 | Unidentified skink | Adult | | | | | 18 | | beneath ACO not captured |
| 1/27/2026 11:24 | Unidentified skink | Sub-adult | | | | | 18 | | beneath ACO not captured |
| 1/27/2026 11:25 | Unidentified skink | Adult | | | | | 18 | | beneath ACO not captured |
| 1/27/2026 12:10 | Unidentified skink | Adult | | | | | 26 | | beneath ACO not captured |
| 1/27/2026 12:11 | Unidentified skink | Adult | | | | | 26 | | beneath ACO not captured |
| 1/28/2026 7:55 | McCanns skink | | | | | | 3 | recapture lizard 1 | |
| 1/28/2026 8:21 | Southern grass skink | Adult | 4.3 | 55 | 50 | 12 | 12 | 8 | |
| 1/28/2026 8:39 | McCanns skink | | | | | | 10 | recapture lizard 3 | |
| 1/28/2026 8:46 | McCanns skink | Adult | 6.3 | 65 | 6 | 42 | 9 | 9 | |
| 1/28/2026 8:53 | Unidentified skink | Adult | | | | | 9 | | basking not captured |
| 1/28/2026 8:58 | McCanns skink | | | | | | 14 | recapture lizard 4 | |
| 1/28/2026 9:01 | McCanns skink | | | | | | 14 | recapture lizard 5 | |
| 1/28/2026 9:07 | McCanns skink | Adult | 4.4 | 53 | 62 | | 15 | 10 | |
| 1/28/2026 9:15 | Unidentified skink | Adult | | | | | 15 | | basking not captured |
| 1/28/2026 9:17 | McCanns skink | Adult | 5.9 | 60 | 69 | | 15 | 11 | |
| 1/28/2026 9:25 | Unidentified skink | Adult | | | | | 15 | | basking not captured |
| 1/28/2026 9:30 | McCanns skink | Sub-adult | 2 | 47 | 63 | | 21 | 12 | |
| 1/28/2026 9:39 | McCanns skink | Adult | 2.2 | 47 | 10 | 40 | 21 | 13 | |
| 1/28/2026 9:52 | McCanns skink | Adult | 3.5 | 54 | 12 | 20 | 16 | 14 | captured in pitfall trap |
| 1/28/2026 10:02 | McCanns skink | Sub-adult | 3 | 48 | 60 | | 17 | 15 | captured in pitfall trap |
| 1/28/2026 10:08 | McCanns skink | Adult | 3.1 | 52 | 21 | 25 | 17 | 16 | |
| 1/28/2026 10:13 | McCanns skink | Adult | 3.3 | 52 | 60 | | 17 | 17 | |
| 1/28/2026 10:23 | McCanns skink | Adult | 5.5 | 56 | 68 | | 18 | 18 | captured in pitfall trap |
| 1/28/2026 10:31 | McCanns skink | Adult | 5 | 57 | 25 | 27 | 18 | 19 | captured in pitfall trap |
| 1/28/2026 10:36 | Unidentified skink | Adult | | | | | 18 | | basking not captured |

| Date/ Time | Species | Age class | Weight (g) | SVL (mm) | Original tail (mm) | Regen tail (mm) | Device cluster | Lizard description | Notes |
|---|---|---|---|---|---|---|---|---|---|
| 1/28/2026 10:37 | McCanns skink | Adult | 3.8 | 46 | 71 | | 18 | 20 | |
| 1/28/2026 10:51 | Unidentified skink | Adult | | | | | 24 | | beneath ACO not captured |
| 1/28/2026 10:53 | McCanns skink | Adult | 5.2 | 60 | 76 | | 24 | | |
| 1/28/2026 10:57 | Unidentified skink | Adult | | | | | 24 | | basking not captured |
| 1/28/2026 11:05 | McCanns skink | Adult | 4.7 | 60 | 79 | | 23 | 22 | captured in pitfall trap |
| 1/28/2026 11:13 | McCanns skink | Adult | 3.9 | 52 | 48 | 17 | 23 | 23 | |
| 1/28/2026 11:26 | Southern grass skink | Adult | 4.3 | 51 | 44 | 10 | 25 | 24 | captured in pitfall trap |
| 1/28/2026 11:33 | McCanns skink | Adult | 6.1 | 64 | 73 | | 25 | 25 | captured in pitfall trap |
| 1/28/2026 11:47 | McCanns skink | Adult | 3.4 | 54 | 66 | | 25 | 26 | captured in pitfall trap |
| 1/29/2026 8:08 | McCanns skink | Adult | 4.5 | 49 | 28 | 24 | 4 | | captured in pitfall trap |
| 1/29/2026 8:50 | McCanns skink | Juvenile | 0.7 | 27 | 32 | | 12 | | |
| 1/29/2026 9:04 | McCanns skink | Adult | 5.5 | 62 | 70 | 2 | 14 | | captured in pitfall trap |
| 1/29/2026 9:11 | McCanns skink | Juvenile | 0.8 | 28 | 31 | | 14 | | |
| 1/29/2026 9:19 | McCanns skink | | | | | | 10 | recapture lizard 3 | |
| 1/29/2026 9:34 | Southern grass skink | Adult | 3.4 | 53 | 62 | | 9 | | captured in pitfall trap |
| 1/29/2026 9:39 | McCanns skink | Adult | 4.2 | 53 | 63 | 2 | 9 | | captured in pitfall trap |
| 1/29/2026 9:44 | McCanns skink | | | | | | 9 | recapture lizard 9 | |
| 1/29/2026 9:57 | McCanns skink | | | | | | 14 | recapture lizard 5 | |
| 1/29/2026 10:01 | McCanns skink | Adult | 3 | 53 | 60 | | 14 | | captured in pitfall trap |
| 1/29/2026 10:15 | McCanns skink | Adult | 4.3 | 52 | 31 | 21 | 15 | | captured in pitfall trap |
| 1/29/2026 10:23 | McCanns skink | Adult | 3.6 | 56 | 35 | 16 | 15 | | captured in pitfall trap |
| 1/29/2026 10:26 | McCanns skink | | | | | | 15 | recapture lizard 11 | |
| 1/29/2026 10:31 | McCanns skink | | | | | | 15 | recapture lizard 10 | |
| 1/29/2026 10:39 | McCanns skink | | | | | | 21 | recapture lizard 13 | |
| 1/29/2026 11:33 | Unidentified skink | Adult | | | | | 18 | | basking not captured |
| 1/29/2026 11:36 | Unidentified skink | Adult | | | | | 18 | | basking not captured |
| 1/29/2026 12:11 | McCanns skink | Adult | 3.8 | 55 | 68 | | 25 | | captured in pitfall trap |
| 1/29/2026 12:24 | Unidentified skink | Adult | | | | | 22 | | basking not captured |
| 1/29/2026 12:31 | Unidentified skink | Adult | | | | | 26 | | basking not captured |
| 1/29/2026 12:32 | McCanns skink | Adult | 4.2 | 57 | 32 | 25 | 26 | | captured in pitfall trap |
| 1/29/2026 12:38 | Unidentified skink | Adult | | | | | 26 | | basking not captured |

Photographs of each individual lizard captured are available upon request.

# Appendix C: Ecological Impact Assessment Methodology

This Ecological Impact Assessment was undertaken follows the guidelines published by the Environment Institute of Australia and New Zealand (Roper-Lindsay et al., 2018).

## C.1 Ecological Value

The overall ecological value of features within the site have been determined by assessing the values of species, communities, habitats, and ecosystems. In order to inform the ecological baseline, ecological features within the site were identified, mapped and their value assessed in terms of representativeness, rarity / distinctiveness, diversity /pattern and ecological context (**Table C1** and **Table C2**)

Each of the four criteria are subjectively scored "High", "Moderate", "Low" or "Nil", based on the assessor's experience and knowledge of the Site. The four scores are then combined to provide a single site score (or score for an area of vegetation/habitat/community) which ranges from "Very High" to "Negligible".

**Table C1.** Attributes to consider when assigning ecological value or importance to a site or area of terrestrial vegetation/habitat/community.

| Matter | Attributes to be Considered |
|---|---|
| **Representativeness** | Criteria for representative vegetation and habitats:<br>• Typical structure and composition<br>• Indigenous species dominate<br>• Expected species and tiers are present<br>• Thresholds may need to be lowered where all examples of a type are strongly modified<br>Criteria for representative species and species assemblages:<br>• Species assemblages that are typical of the habitat<br>• Indigenous species that occur in most of the guilds expected for the habitat type |
| **Rarity/Distinctiveness** | Criteria for rare/distinctive vegetation and habitats:<br>• Naturally uncommon, or induced scarcity<br>• Amount of habitat or vegetation remaining<br>• Distinctive ecological features<br>• National priority for protection<br>Criteria for rare/distinctive species or species assemblages:<br>• Habitat supporting nationally Threatened or At Risk species, or locally uncommon species<br>• Regional or national distribution limits of species or communities<br>• Unusual species or assemblages<br>• Endemism |

| Matter | Attributes to be Considered |
|---|---|
| **Diversity and Pattern** | • Level of natural diversity, abundance and distribution<br>• Biodiversity reflecting underlying diversity<br>• Biogeographical considerations – pattern, complexity<br>• Temporal considerations, considerations of lifecycles, daily or seasonal cycles of habitat availability and utilisation |
| **Ecological Context** | • Site history, and local environmental conditions which have influenced the development of habitats and communities<br>• The essential characteristics that determine an ecosystem's integrity, form, functioning, and resilience (from "intrinsic value" as defined in RMA) |

## C.2 Magnitude of Effect

The ecological effects assessment includes several steps that collectively assess the way the proposed development will interact with elements of the physical and biological environment to produce effects to habitat and receptors. The method for determining the level of effect is outlined in the following sections.

Basic impact characteristic terminology and respective descriptors in line accordance with the EIANZ Guidelines and are provided in **Table C3**.

**Table C3.** Magnitude of effect assessment terminology.

| Characteristic | Definition | Designations |
|---|---|---|
| Type | A descriptor indicating the relationship of the impact to the Project (in terms of cause and effect). | Direct |
| | | Indirect |
| Extent | The "reach" of the impact (e.g., confined to a small area around the Project Footprint, projected for several kilometres, etc.) | Local |
| | | Regional |
| | | National |
| Duration | The time period over which a resource / receptor is affected. | Temporary (days or months) |
| | | Short-term (<5 years) |
| | | Long-term (15-25 years) |
| | | Permanent (>25 years) |
| Frequency | | Infrequently |
| | | Periodically |

| Characteristic | Definition | Designations |
|---|---|---|
| | A measure of the constancy or periodicity the receptor will be affected. | Frequently |
| | | Continuously |
| Likelihood | The probability of an effect occurring if it is unplanned. | Highly Unlikely |
| | | Unlikely |
| | | Likely |
| | | Highly Likely |
| | | Definite |
| Reversibility | The degree to which the ecological effect can be reversed in a reasonable time scale through natural processes or mitigation. | Totally |
| | | Partially |
| | | Irreversible |
| | | Not applicable |

Based on the above-mentioned descriptors, the characteristics of each effect are used to assign a magnitude to the specific effect. Magnitude designations are provided in **Table C4**.

**Table C4.** Criteria for describing magnitude of effect from Table 8 of the EIANZ guidelines.

| Magnitude | Description |
|---|---|
| **Very high** | Total loss of, or very major alteration to, key elements/features/ of the existing baseline conditions, such that the post-development character, composition and/or attributes will be fundamentally changed and may be lost from the site altogether; AND/OR Loss of a very high proportion of the known population or range of the element/feature |
| **High** | Major loss or major alteration to key elements/features of the existing baseline conditions such that the post-development character, composition and/or attributes will be fundamentally changed; AND/OR Loss of a high proportion of the known population or range of the element/feature |
| **Moderate** | Loss or alteration to one or more key elements/features of the existing baseline conditions, such that the post-development character, composition and/or attributes will be partially changed; AND/OR Loss of a moderate proportion of the known population or range of the element/feature |
| **Low** | Minor shift away from existing baseline conditions. Change arising from the loss/alteration will be discernible, but underlying character, composition and/or attributes of the existing baseline condition will be similar to pre-development circumstances or patterns; AND/OR having a minor effect on the known population or range of the element/feature |
| **Negligible** | Very slight change from the existing baseline condition. Change barely distinguishable, approximating to the 'no change' situation; AND/OR having negligible effect on the known population or range of the element/feature |

## C.3 Level of Effect

The level of ecological effect is based on combining the ecological value of a feature that is actually or potentially impacted by the proposed activity and the magnitude of the effect as per **Table C5** below.

**Table C5.** Criteria for describing level of effects, from Table 10 of the EIANZ guidelines.

| **Magnitude** | **Ecological value** | | | | |
|---|---|---|---|---|---|
| | **Very high** | **High** | **Moderate** | **Low** | **Negligible** |
| **Very high** | Very high | Very high | High | Moderate | Low |
| **High** | Very high | Very high | Moderate | Low | Very low |
| **Moderate** | High | High | Moderate | Low | Very low |
| **Low** | Moderate | Low | Low | Very low | Very low |
| **Negligible** | Low | Very low | Very low | Very low | Very low |
| **Positive** | Net gain | Net gain | Net gain | Net gain | Net gain |

From **Table C3**, the level of effect designations is defined below:

- Negligible: An effect of negligible consequence is one where habitat or receptors will not be affected in any meaningful way by a Project activity, or the predicted effect is indistinguishable from natural background variations.
- Low: An effect of minor consequence is one where habitat or receptors will experience a noticeable effect, but the effect magnitude is sufficiently small (with or without mitigation) and / or the resource / receptor is of low ecological value. In either case, the magnitude should be well within applicable standards.
- Moderate: An effect of moderate consequence has an effect magnitude that is within applicable standards but higher than that of a minor effect. The emphasis for moderate effects is to show that the effect has been reduced or minimised in line with the mitigation hierarchy.
- High: A high level of effect of is one where an accepted limit or standard may be exceeded, or moderate magnitude of effect will occur to moderate or high value habitat or receptors.
- Very High: A very high level of effect will occur when the magnitude and value of effects are assessed as high or very high. Typically, very high level of effects notably exceeds standard limits.

An effect level of Low or Very Low indicates the effect is ecologically less than minor.

Where the level of effect is Moderate or above, an impact management response consistent with the mitigation hierarchy. The priority in mitigation is to first apply mitigation measures to the source of the impact (avoid) and then to address the resultant effects (reduce or minimise) of the impact.

## C.4 Residual Impact

The residual impact is the final impact level assigned to the proposed activity and potential effects once proposed mitigation/ remediation options have been applied. Where significant residual impacts arise

from the proposed activity after mitigation/ remediation options have been applied a biodiversity offset or compensation should be applied.

## C.5 Managing Uncertainty

Biophysical impacts are difficult to predict with certainty, but uncertainty stemming from on-going development of the Project design and implementation is inevitable, and the environment is variable over time. If uncertainties are relevant to the effect assessment, they were stated and approached conservatively, to identify a range of likely residual effects and relevant mitigation measures.

## C.6 Cumulative Effects

Cumulative impacts and effects are those that arise because of an impact and effect from the Project interacting with those from another activity to create an additional impact and effect. These are termed cumulative impacts and effects. No structured methods were employed to assess cumulative impacts, but where relevant descriptions of potential cumulative effects have been provided.