BLUEPRINT ECOLOGY

30 October 2025

Lizard Assessment

Puke Kapo Hau - Mahinerangi Wind Farm Stage 2

PREPARED FOR SLR CONSULTING NEW ZEALAND LIMITED

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Contents

Terms of Reference

Windfarm Site	1,723 ha area incorporating all the Zones and Areas listed below, including the Thomas Block, which is not part of Stage 2.
Contingency Zone	Specific development location for each wind turbine
Windfarm Buffer Area	A minimum 50 m buffer to high ecological value areas, as identified in the original ecological assessment. Referred to as “ecological buffer areas” in the resource consent conditions and retained for Stage 1 works.
Windfarm Development Area	The land available for works, shaped to respond to the preferred areas for development of the wind farm.

1.0 Introduction

1.1 Background

Tararua Wind Power Limited ("TWP"), a fully owned subsidiary of Mercury NZ Limited, is progressing Stage 2 of the Mahinerangi Wind Farm which is to be known as "Puke Kapo Hau" ("the Project", "Puke Kapo Hau" or "MWF Stage 2"), through a Substantive Application under the Fast-track Approvals Act 2024 (FTAA). The site area of the Mahinerangi Wind Farm Site is approximately 1,723 ha and is located on the eastern foothills of the Lammermoor Range at approximately 600m and 730 m elevation, situated approximately 5 km north of Lake Mahinerangi and approximately 50 km west of Dunedin. The west and north-western boundary of the MWF is bounded by the Te Papanui Conservation Park and Black Rock Scientific Reserve. The MWF is situated within a predominately pastoral setting that has a backdrop of lesser developed land at the Lammermoor Range.

Resource consents for the MWF were granted by the Environment Court in 2009[1] and authorise up to 100 wind turbines, with a maximum tip height of 145 m. Stage 1 of the wind farm was completed in 2011 and involved 12 Vestas V90 turbines with a tip height of 125 m. Stage 2 is proposed to consist of 44 additional turbines (in addition to those 12 turbines already constructed in Stage 1) which will have a maximum tip height of 165 m within 54 possible turbine locations and associated up to 100m radius contingency zones (CZs).[2] The consented layout for the Mahinerangi Wind Farm is shown in **Figure 1** and the proposed layout for Stage 2 is shown in **Figure 2**. Through the use of larger turbines, the Stage 2 proposal includes a significantly smaller development footprint and much more efficient use of land than what has been consented in the Windfarm Development Area. Of note, the Thomas Block, a high-quality tussock-grassland dominated area at the western edge of the MWF site, is excluded from the Stage 2 layout (i.e., removed from the Windfarm Development Area).

Stage 2 is a Schedule 2 Listed Project under the FTAA. TWP is seeking approval for Stage 2 by way of a change or cancellation of resource consent conditions that would be otherwise applied for under the Resource Management Act 1991 (i.e. a substantive application under s42(4)(b) of the FTAA). Clause 23 to Schedule 5 confirms that s127(1) and (3) of the Resource Management Act 1991 applies which means that it is the change in effects between the consented and proposed Stage 2 layout that is a focus of this report. This approach is adopted here because the MWF activities were consented in 2009 with conditions that appropriately manage effects. Moreover, substantive compensation actions have been carried out by TWP to manage adverse effects over the entire consented layout (not just Stage 1); where they have yielded significant benefits to lizards well in advance of the consented impacts. For example, a 59.2 ha QEII Open Space Covenant was created which included the clearance of hectares of wilding pines and the retirement of pasture and grazed tussock grassland. Over the past 15 years, this has since regenerated into dense snow tussock grassland (*Chionochloa rigida*) with very high-quality habitat values for native lizards.

The main differences between the consented layout and the Stage 2 layout are changes to the number of turbines (100 down to only 44 plus 12 existing) and of note, the Thomas Block, a high-quality tussock-grassland dominated area at the western edge of the MWF site, is excluded from the Stage 2 layout (**Figure 1**). In addition to the Stage 2 variation approval, TWP seeks new consents for various activities

[1] *Upland Landscape Protection Society Inc v Clutha District Council* C140/2008 [2008] NZEnvC 356 (15 December 2008).

[2] The use of up to 100m radius CZs were confirmed by the Environment Court.

including a new 110 kV transmission line, a substation, and a Battery Energy Storage System (BESS) (**Figure 2**).

The main differences between the consented and proposed layout are summarised in **Table 1**.

Table 1. Main differences between the consented and proposed layout.

Attribute	Consented layout	Realistic 2025 equivalent of consented layout	Proposed layout
Turbine locations	100	88 (plus stage 1)	54
Turbines to be built	100	47 (plus stage 1)	44
Tip height	Maximum 145 m	Maximum 145 m	Maximum 165 m
Transmission line	Was a Permitted Activity at the time		New application
Thomas Block	Included	Included	Excluded

Blueprint Ecology Limited (Blueprint Ecology) was engaged by SLR Consulting Limited (SLR) to provide an expert assessment of the actual and potential effects to native lizards with respect of the FTAA substantive applications including those for changes to resource consent conditions; new land use applications; and Schedule 7 approvals relating to the Wildlife Act 1953. This included:

- Assess lizard species and habitats known or predicted to be present over the Stage 2 Windfarm Development Area and the transmission line corridor.
- Assess the actual and potential adverse effects of the construction and ongoing operation of the Stage 2 of the MWF and new activities 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.
- Assess the Schedule 7 Wildlife approvals against the relavant criteria and provisions contained in the FTAA.

1.2 Project Overview

Stage 2 includes the following key features relevant to lizards (Civil Engineering Report, Riley 2025):

- Internal roading network that will provide vehicular access to the turbine locations during and following construction, with various connections from Eldorado Track. Tracks will be an unsealed granular pavement with a minimum width of 5.5 m and additional widening at bends to accommodate turbine component delivery vehicles. The roading network is proposed to be reduced from 37 km as consented to 31 km.
- The movement of some turbines from their consented locations with amendments to CZ – some of which are proposed within what were the consented Wind Farm Buffer Areas.

- Works in or within 10 m of a natural inland wetland where avoidance is not practicable and where the is a functional need for the works.
- Turbine platform/hardstand areas are required for storage of components and placement and erection of the crane for installation. The main (hardstand) portion is retained as a gravel pad for future turbine maintenance activities.
- Electrical reticulation, with underground cables between the turbines and the substation.
- A substation (c.0.39 ha).
- A BESS (c.0.42ha), to store surplus power.
- An overhead 110kV transmission line between the substation and existing overhead power lines located to the south of the site, with 25 pole/tower structures up to 45 m high. Consent is sought to locate the lines/poles within a 100m wide corridor, measured 50 m either side of the indicative route, subject to any environmental constraints. Access tracks will be formed to provide maintenance access to each structure location.
- Operations and Maintenance (O&M) facility (indicative sizing of approximately 2,200 m^2, including 700 m^2 of buildings).
- Some new Surplus Fill Disposal (SFD) locations that differ from the consented locations due to movement of some Turbines.

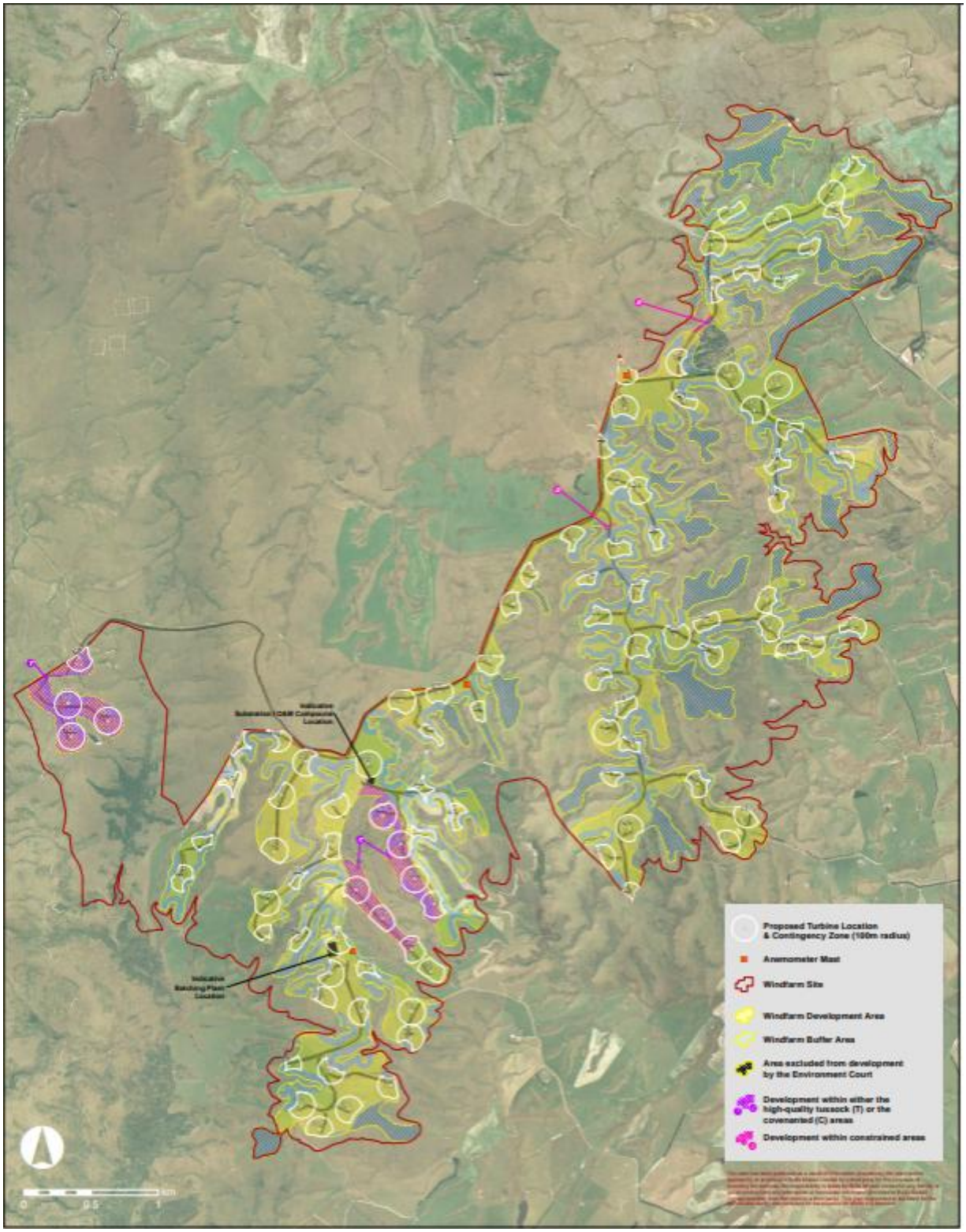

Figure 1. The consented layout for Mahinerangi Wind Farm (Boffa Miskell Plan BML W07190/1)

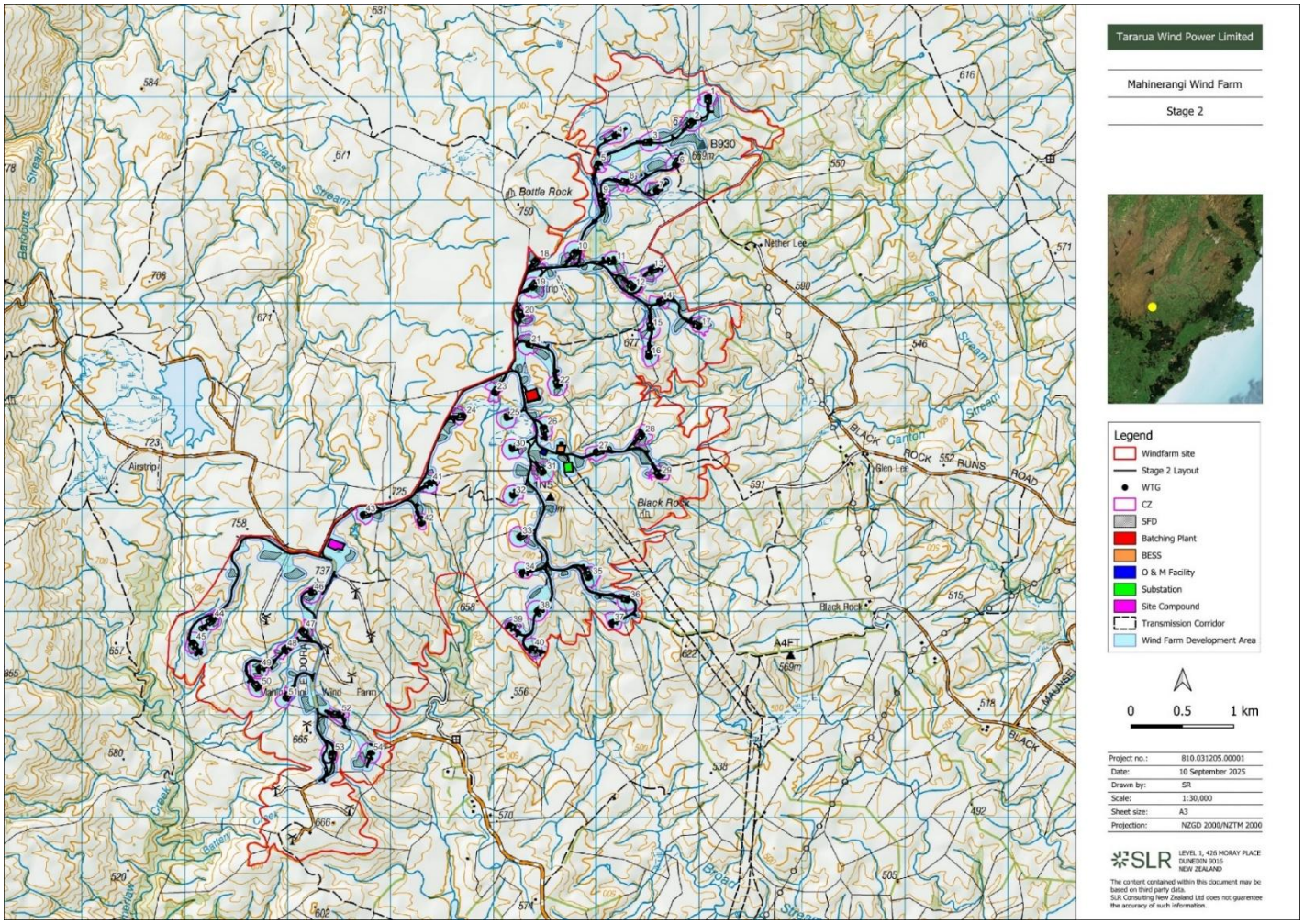

Figure 2. The proposed Mahinerangi Windfarm Stage 2 layout. Figure provided courtesy of SLR.

2.0 Ecological Context

The site is located on the border between the "wet south east" environmental zone and the "dry grassland" vegetation zone of Waipori Ecological District in Lammerlaw Ecological Region, with approximately 800-1,000 mm of annual rainfall (Carter 1994). Prior to the arrival of Europeans, the dominant vegetation type in the ecological district would have been low- to mid-altitude short and tall tussock grassland (with narrow-leaved snow tussock, copper tussock (*Chionochloa rubra* subsp. *cuprea*), and hard tussock (*Festuca novae-zelandiae*)), which has now been mostly converted to pasture up to about 600 m asl (McEwen 1987). The geology in the area is dominated by schist-block mountains and fault-controlled basins which have eroded to form the Otago peneplain surface (Bishop 1994, ORC 2013). The majority of the site lies within the headwaters of the Lee Stream catchment at about 675-700 m asl. West of the main access road along the paper road portion of Eldorado Track, gullies are part of the Deep Stream catchment. Gullies are generally shallow and broad in the upper reaches, becoming further incised downstream.

Most of the Wind Farm Site, in the process of conversion to farmland, has been burnt and grazed, and some parts cultivated, but prior to 1840 would have been similar to the adjacent Black Rock Scientific Reserve which lies outside the Wind Farm Site to the west of Turbine 12 (constructed during Stage 1) and immediately adjacent to the proposed access road to Stage 2 of the MWF (**Figure 4**). The reserve consists of "gently rolling ridges covered in a narrow-leaved snow tussock association, substantially intact or in various stages of degradation, and shallow gullies containing Sphagnum bog and minor grassland communities" (Bulloch 1973).

Te Papanui Conservation Park, which is dominated by snow tussock grassland and contains bogs and tarns, is located c.4 km to the west of the Wind Farm Site. Following completion of the Stage 1 of the wind farm, a 59.2 ha QEII Open Space Covenant was created in accordance with the consent conditions for the MWF over an area formerly referred to as the "Scrappy Pines Block"[3]. Condition 14 required the covenanting of the Scrappy Pines Block "no later than six months after the construction of the turbines and the rehabilitation of tracks". Not all of the consented turbines within the Scrappy Pines Block were constructed as part of Stage 1, however TWP is not proposing any further works within the Block as part of Stage 2. The QEII covenanted area predominantly contains snow tussock grassland and is located in the southern part of the wind farm (**Figure 4**).

A Marginal Strip is also located alongside the Lammerlaw Creek to the southwest of the Wind Farm Site (**Figure 4**). No works for Stage 2 are proposed within the marginal strip. Recommended Area for Protection (RAP) 9 Black Rock from the Protected Natural Areas Programme (PNAP) report for Waipori Ecological District (Carter 1994) is located west of proposed turbine sites 39 and 40 (Figure C) outside of the Wind Farm Development Area (see **Figure 4**). The RAP was described as containing representative silver beech (*Lophozonia menziesii*) forest that is much reduced in extent in the ecological district and shrubland of Coprosma dumosa, tauhinu (*Ozothamnus vauvilliersii*), *Veronica odora*, and bracken (*Pteridium esculentum*). No works for Stage 2 are proposed within the RAP.

[3] See Condition 14, Land use consent RM1409

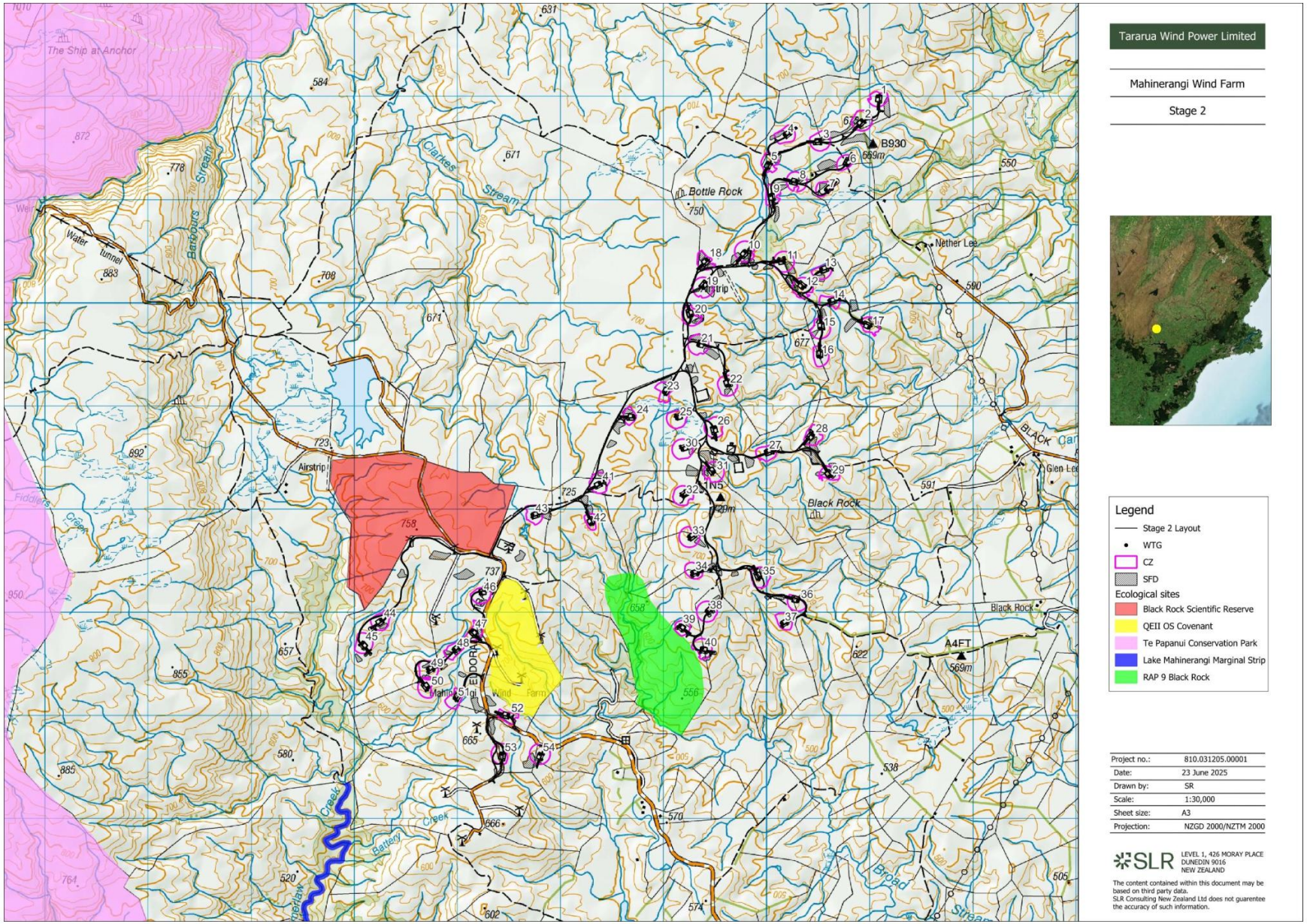

Figure 3. Ecological sites near the MWF Stage 2. Figure provided courtesy of SLR.

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, and these were refined by excluding records older than 20 years as these will likely not be representative of the current species composition (**Figure 4**). Information sources also included:

- A review of the ecology report that informed the MWF consents.[4]
- Google Earth imagery (dated 10/11/24) to assess habitats present along with SLR terrestrial vegetation mapping (SLR Consulting Ltd 2025).
- DOC survey reports.
- PNAP report for Waipori.

The desktop lizard assessment determined that the rolling hill country over which the MWF site was known to once support up to eight lizard species, of which only seven are extant (**Table 2**). A detailed description of each species is provided in the following sections.

Figure 4. MWF site (white), lizard records (colour points), 30 km buffer (red line)

[4] Kingett Mitchell Ltd November 2006 report. Mahinerangi windfarm ecological assessment.

McCann's Skink

McCann's skinks are common throughout rural Otago and tend to persist in a variety of degraded habitats longer than other lizard species. Records for McCann's skink are present in the DOC Herpetofauna database within 20 km of the MWF site, including at the altitudes of the MWF site. McCann's skinks were found over the consented layout in 2006 (Kingett Mitchell Ltd 2006)[5] and was described as "common and tended to be associated exclusively with rocky tors and outcrops".

Tussock skink

Tussock skinks (referred to in earlier reports as 'southern grass skink'[6]) occupy a relatively narrow range of habitats compared to McCann's, occurring in tussock lands, rough pastures, open shrublands and wetlands. In 2006 tussock skinks were noted as occurring in "open tussock grassland areas and around rocky outcrops" (Kingett Mitchell Ltd 2006). There are several records of tussock skink in the DOC Herpetofauna database within 5 km of the MWF site.

Kōrero gecko

Kōrero gecko have experienced declines in Otago over the last 30-years; a once common gecko species is now becoming harder to find (M. Tocher pers. obs). Kōrero geckos were detected in the 2006 ecological assessment that informed Stage 1 of the MWF (Kingett Mitchell Ltd 2006) where they were described as "relatively common on rocky tors and outcrops." In terms of habitats, Kingett Mitchell Ltd 2006 state that "geckos were not observed within tussock or pastoral grassland areas" but do not specifically exclude them from rocky tors and outcrops in these habitats. The 2006 survey did not provide georeferenced locations of kōrero gecko, or indeed any lizard species, meaning the 'commonness' of kōrero geckos cannot be fully ascertained over the MWF site. The schist over the MWF site is "undifferentiated Caples Terrane TZIII schist"[7] which is known for its quartz veins and minimal foliation making it blocky and substandard as lizard habitat compared to other schist in Otago (e.g., around Alexandra). For this report, therefore, the likelihood of kōrero geckos being present over the MWF site has been assessed as "Low" given the lack of records nearby and the quality of rock habitats present.

Jewelled gecko

Jewelled geckos, an arboreal (tree-dwelling) gecko, are thought to be once relatively common in the vicinity of Lake Mahinerangi (Whitaker et al. 2002) and were found at Black Rock within 3 km of the site. They are also known from Lammerlaw Stream catchment (Carter 1994) and Nardoo Scenic Reserve immediately to the west of the Stage 2 project area (Ward and Munro 1989).

No jewelled geckos were found over the MWF site during the 2006 survey that included a night search of shrubby areas north of Black Rock Scientific Reserve (Kingett Mitchell Ltd 2006). Based on habitats present and the degree of modification/removal of shrublands over the MWF site, the likelihood of jewelled geckos being present over the MWF site has been assessed as "Low".

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[5] It is not known with certainty that tussock skinks were found during the 2006 survey as Figure 3.14 describes a McCann's skink as a common skink (equivalent to a southern grass skink in 2006).

[6] *Oligosoma* aff. *polychroma* clade 5 which was classified as "At Risk – Declining" by DOC in 2021 (Hitchmough *et al.* 2021).

[7] https://data.gns.cri.nz/geology/

Burgan skink

Burgan skinks have only recently been described (Chapple *et al*. 2011) and are currently considered an alpine specialist. Recent survey work has expanded their known distribution over the Otago uplands, but all records occur in areas of dense vegetation at altitudes above 700 m asl. (Wildlands 2019, 2020, 2021 and 2022; M. Tocher pers. obs.). The likelihood of Burgan skinks being present over the MWF site, that takes in altitudes not known to support Burgan skinks, has been assessed as "Very low".

Herbfield skink

Herbfield skinks (Jewell 2022) were once known as cryptic skinks over large swathes of Otago including areas adjacent to the MWF site (e.g., near the Waipori dam; Tony Jewell pers. comm., May 2025). It is possible that records of both tussock skink and McCann's skink have been confused for herbfield skink by inexperienced observers as they can look very similar. Herbfield skinks usually inhabit damp, densely vegetated microsites in grassland, indigenous herb fields and open shrublands. The presence of herbfield skinks over the MWF site has not been confirmed, despite reference to cryptic skinks being recorded "locally around the MWF site" in the 2006 ecological assessment that informed Stage 1 of the MWF (Kingett Mitchell Ltd 2006). Notably, surveys by a team of experienced herpetologists failed to detect herbfield skinks over the MWF site in 1987 (Whitaker 1987) which is consistent with a description of the distribution of the species as "patchy and localised" (Whitaker 2002). Based on habitats present, herbfield skinks have been assessed as having a 'Very low' likelihood of being present over the MWF site.

Otago green skink

Otago green skinks are large-bodied skinks that require dense vegetation and rock to survive in a predator-loaded environment such as MWF site (Tocher 2006). No records for Otago green skink were found in the DOC herpetofauna database for the MWF site or nearby areas, and Otago green skinks were not detected over the 2006 lizard survey that informed Stage 1 of the MWF (Kingett Mitchell Ltd 2006) or in a 2021 survey to inform the Lake Onslow Battery Project (Konlechner et al. 2022), noting this survey concentrated effort about 700 m asl. Well outside the MWF site, a green skink was found in 2009 along the Teviot River South Branch (c. 25 km west from the centre of the MWF site; Konlechner et al. 2022). A 1987 lizard survey of the area also failed to detect green skinks south of Sutton Stream despite suitable habitat occurring elsewhere (Whitaker 1987). For this report therefore, and based on habitats present, Otago green skinks have been assessed as having a 'Very low' likelihood of being present over the MWF site.

Grand skink

The 2006 lizard survey to inform Stage 1 MWF found a mummified grand skink c. 4 km north of the Stage 2 MWF layout (Kingett Mitchell Ltd 2006). Grand skinks are known from multiple rocky sites north of the Stage 2 MWF layout but are considered locally extinct (Whitaker 1987; latest recovery plan). Indeed, mummified remains of grand skinks have been found at Macraes Flat over areas where skinks have not been seen for many decades (M. Tocher pers. obs). Moreover, the low foliation characteristics of the schist over the MWF site is not conducive to the long-term persistence of grand skinks unless predator control is undertaken (Tocher 2006, Reardon et al. 2012). In our opinion, grand skinks are locally extinct and there is no likelihood of being present over the MWF site.

Table 2. Characteristics of the native lizard species recorded in the DOC national herpetofauna database from the Ecological District.

Common Name (Scientific Name)	National Threat Classification (Hitchmough et al., 2021)	Regional threat classification (Jarvie et al., 2024)	Applicable habitats within the Stage 2 project area	Likelihood of occurrence in MWF Stage 2
McCann's skink (*Oligosoma maccanni*)	Not Threatened	Not Threatened	Exotic grassland and crops (cultivated); sparse snow tussock grassland; dense snow tussock grassland; indigenous shrubland (degraded), shelterbelts, wetlands, rock habitat over all habitats	Confirmed
Tussock skink (*Oligosoma chionochloescens*)[8]	At Risk - Declining*	Regionally Declining	Exotic grassland and crops (cultivated); sparse snow tussock grassland; dense snow tussock grassland; indigenous shrubland (degraded), wetlands, rock habitat over all habitats	Confirmed
Kōrero gecko (*Woodworthia* "Otago/Southland large")	At Risk - Declining	Regionally Declining	Rock habitat in sparse snow tussock grassland, dense snow tussock grassland and indigenous shrubland (degraded)	Low
Jewelled gecko (*Naultinus gemmeus*)	At Risk - Declining	Regionally Declining	Any woody vegetation in dense snow tussock grassland; indigenous shrubland (degraded), wetlands	Low
Burgan skink (*Oligosoma burganae*)	Threatened – Nationally Endangered	Regionally Vulnerable	No suitable habitats identified over the MWF site	Very low
Herbfield skink (*Oligosoma murihiku*)	At Risk - Declining	Regionally Declining	Dense snow tussock grassland, wetland	Very low

[8] Tussock skink was described after the NZTCS assessment for reptiles (Hitchmough et al. 2021). We have assumed in this report that it will share same national and regional threat ranking as southern grass skink, *Oligosoma* aff. *polychroma* clade 5.

Common Name (Scientific Name)	National Threat Classification (Hitchmough et al., 2021)	Regional threat classification (Jarvie et al., 2024)	Applicable habitats within the Stage 2 project area	Likelihood of occurrence in MWF Stage 2
Otago green skink (*Oligosoma aff. chloronoton* "eastern Otago")	Threatened – Nationally Critical[9]	Regionally Declining	Rock habitat within dense snow tussock grassland, indigenous shrubland (degraded) and wetlands	Very low
Grand skink (*Oligosoma grande*)	Threatened – Nationally Endangered	Regionally Endangered	No suitable habitats identified over the MWF site	Nil (locally extinct)

[9] Assessed as *Oligosoma chloronoton*. Work is underway on formalising a four-way split within the *Oligosoma chloronoton* species.

4.0 Lizard Habitats

The site is characterised by a network of waterways/gullies separated by low ridges. The flat ridgetops largely contain grazed exotic grassland and brassica crops. Modified remnants of snow tussock grassland remain at some ridgetop sites, and on gully walls which are more difficult to develop for farming activities. Wetlands are present in gully floors, on gully walls, and in flatter areas where drainage is poor. Indigenous shrublands are present at a few sites on gully walls and floors. A small area of recently replanted plantation forest is present. Rock outcrops are generally small and uncommon.

Vegetation communities over the MWF Stage 2 development area are mapped and described in detail by SLR (SLR Consulting New Zealand Ltd 2025). Mapping of terrestrial vegetation was undertaken by SLR within all new development areas, including:

- All areas within the proposed Stage 2 works area, including CZs.
- 25 m either side of the road and identified SFD extents.
- 50 m from hardstands, including the BESS, O & M Facility, batching plant, and substation.
- The 100 m-wide Transmission Corridor and 25 m either side of Transmission Corridor access tracks.

The extent of vegetation communities as they relate to each of the specific development sites are provided in **Table 3**. Vegetation communities are interpreted to lizard habitat quality, as summarised in **Table 4**.

Table 3. Extent of habitat type lost against each development component.

Vegetation and Habitat Type	CZ (54 locations)	SFD	BESS	O&M Facility	Substation	Batching plant	Site compound	Internal Roads
Snow tussock grassland	9.80	2.10	0	0	0	0	0	1.9
Indigenous shrubland	0	0	0	0	0	0	0	<0.1
Wetland	0	0	0	0	0	0	0	<0.1
Rough pasture	20.22	6.25	0	0.2	0	0	0	3.15
Rock	<0.1	<0.1	0	0	0	0	0	<0.1
Remaining exotic vegetation	78.47	33.22	0.42	0.20	0.66	1.07	1.03	21.9
Total	108.48	41.58	0.42	0.22	0.66	1.07	1.03	25.05

Table 4. Vegetation communities and habitats relating to lizard habitat quality.

Vegetation community and habitats	Description	Lizard habitat quality	Comment
Indigenous shrubland	Dominant species are *Olearia bullata* and *Coprosma propinqua*, with scattered shrub pōhuehue (*Muehlenbeckia complexa*) and *Coprosma dumosa*. The groundcover in gully floor shrublands includes rautahi (*Carex coriacea*), sphagnum moss, rushes (*Juncus* spp.), *Hypolepis millefolium*, and pasture grasses.	Low to High	Provides potential habitat for At Risk jewelled gecko.
Snow tussock grassland (**Plate 1**)	The dominant species is narrow-leaved snow tussock (*Chionochloa rigida*) which on average has a cover greater than 50%. Exotic grasses and herbs are common, including browntop (*Agrostis capillaris*), sweet vernal(*Anthoxanthum odoratum*), Yorkshire fog (*Holcus lanatus*), white clover (*Trifolium repens*), mouse-ear hawkweed (*Pilosella officinarum*), and catsear (*Hypochaeris radicata*). Golden speargrass (*Aciphylla aurea*) is scattered and uncommon.	Low to High	Provides habitat for At Risk species including jewelled gecko and tussock skink. Tussock skinks are almost certain to inhabit all of these areas as well as a high abundance of Not Threatened McCanns Skink.
Rough pasture (**Plate 2**)	Comprises exotic grassland with a few to scattered narrow-leaved snow tussocks and/or golden speargrass	Low to Moderate	Provides habitat for At Risk tussock skink. Tussock skinks are likely to inhabit most of these areas, and Not Threatened McCann's skink are in relatively high abundance.
Natural wetlands	Common species include sphagnum moss, other mosses, star sedge (*Carex echinata*), rautahi, jointed rush (Juncus articulatus), blinks (Montia fontana), Edgar's rush (Juncus edgariae), soft rush (Juncus effusus), and exotic grasses.	Low to High	Provides potential habitat for At Risk tussock skink. Tussock skinks are likely to inhabit fewer of these areas relative to other vegetation communities, and McCann's skink are in relatively low abundance.
Rock (**Plate 3**)	A variety of rock habitat is present, and most areas are heavily disturbed by stock. These also consist of 'man-made' collections of rocks moved into rough piles within cultivated paddock. These piles are heavily disturbed by stock; have no indigenous vegetation cover, and as well, the lichen communities had been removed. Such habitats, although at times large (>5 x 5 m in area),	Low to Moderate	Rocks are generally poorly creviced and provide little cover for any lizards present.
Plantation forest	An area of recently felled radiata pine forest This area has been replanted in Douglas fir (*Pseudotsuga menziesii*) which are still less than 1 m tall, although numerous small radiata pine seedlings have regenerated from seed in the soil. The site is dominated by windrows of decomposing waste wood and browntop-	Low	Provides potential habitat for McCann's skink in relatively low abundance.

Vegetation community and habitats	Description	Lizard habitat quality	Comment
	dominated grassland on open ridgetops, and a few patches of bracken (*Pteridium esculentum*) on gully walls.		
Shelterbelts	Shelterbelts contain various mixes of radiata pine (*Pinus radiata*), another pine species (*Pinus* sp.), Douglas fir, eucalyptus (*Eucalyptus* sp.), Lawson's cypress (*Chamaecyparis lawsoniana*), silver birch (*Betula pendula*), macrocarpa (*Cupressus macrocarpa*), and alder (*Alnus glutinosa*)	Low	Provides potential habitat for McCann's skink in relatively low abundance.
Developed pasture, crops and roads (**Plate 1**)	In the more developed sites, perennial ryegrass (*Lolium perenne*) and white clover are dominant. Open areas within less developed grasslands are dominated by mouse-ear hawkweed (*Pilosella officinarum*), and catsear (*Hypochaeris radicata*), with scattered exotic grasses (particularly browntop and sweet vernal).	Nil	The consistent disturbance and lack of complex cover means that these areas do not provide habitat for native lizards.

Plate 1. Snow tussock grassland (left) within the Te Papanui Conservation Park, and developed pasture (right) within the MWF Stage 2 layout.

Plate 2. Typical rough pasture with minor cover of tussocks and scattered golden Spaniard.

Plate 3. A typical area of rock within a paddock. These areas are often man-made cairns.

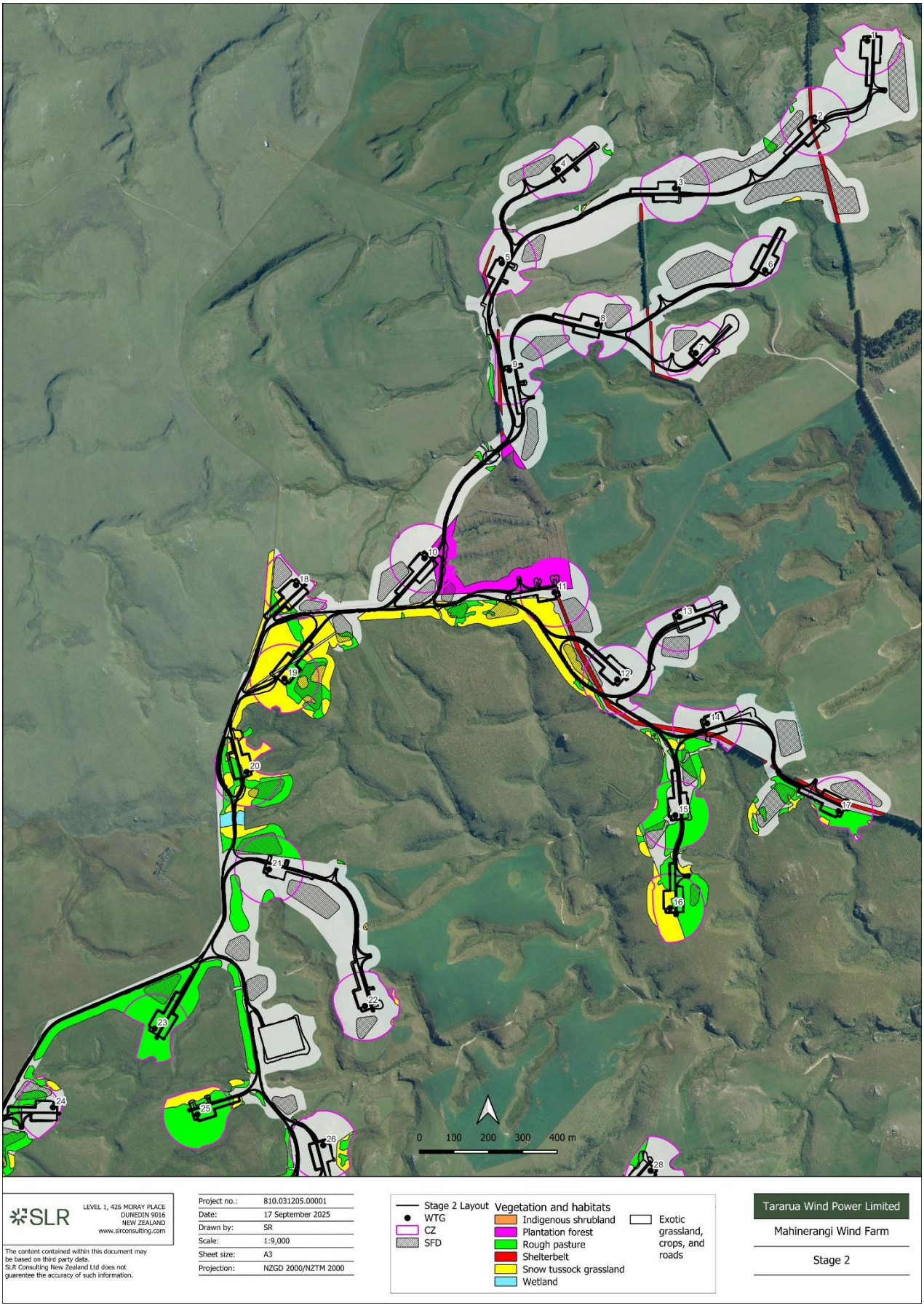

Figure 5. Vegetation and habitats. Figure provided courtesy of SLR.

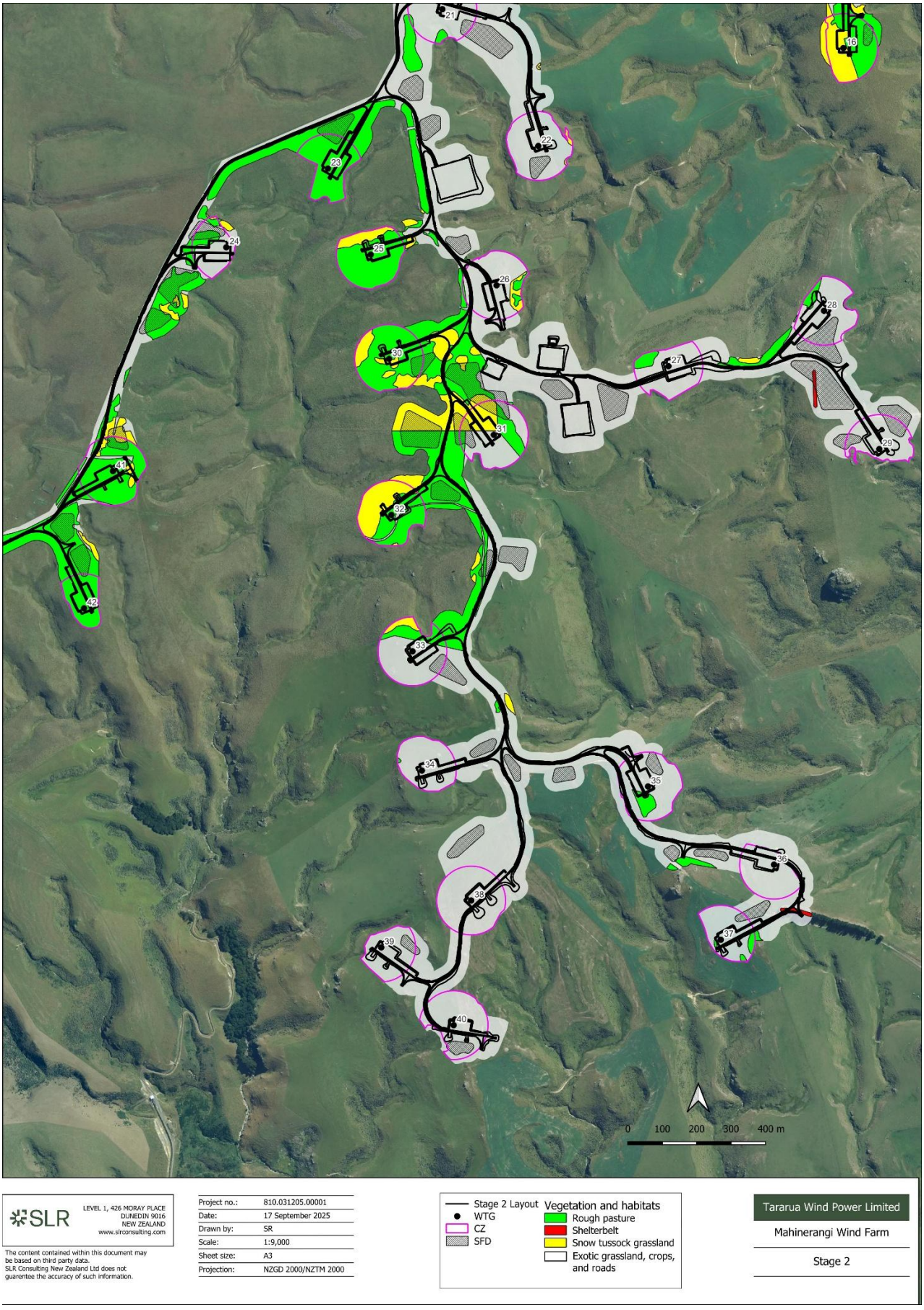

Figure 6. Vegetation and habitats. Figure provided courtesy of SLR.

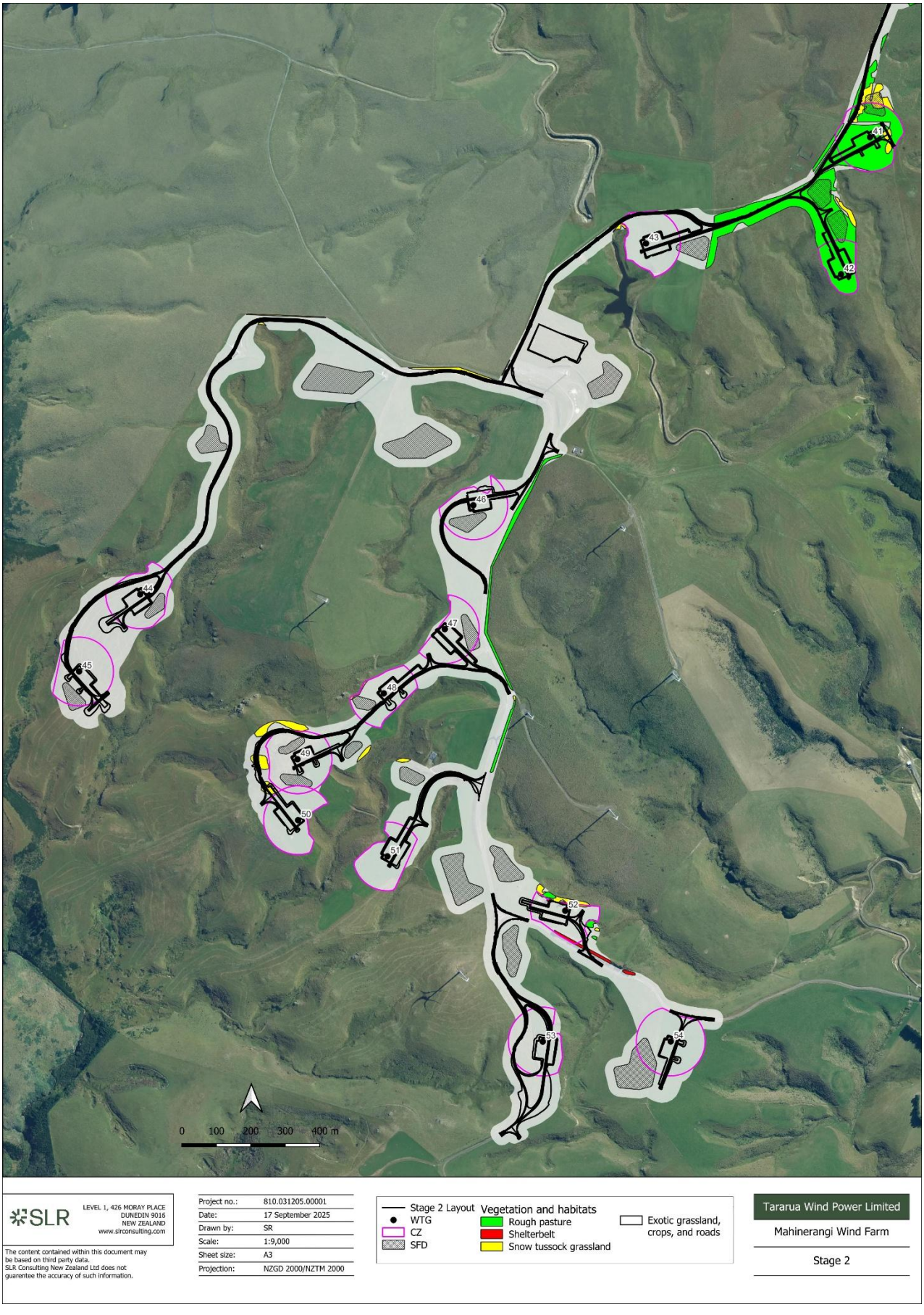

Figure 7. Vegetation and habitats. Figure provided courtesy of SLR.

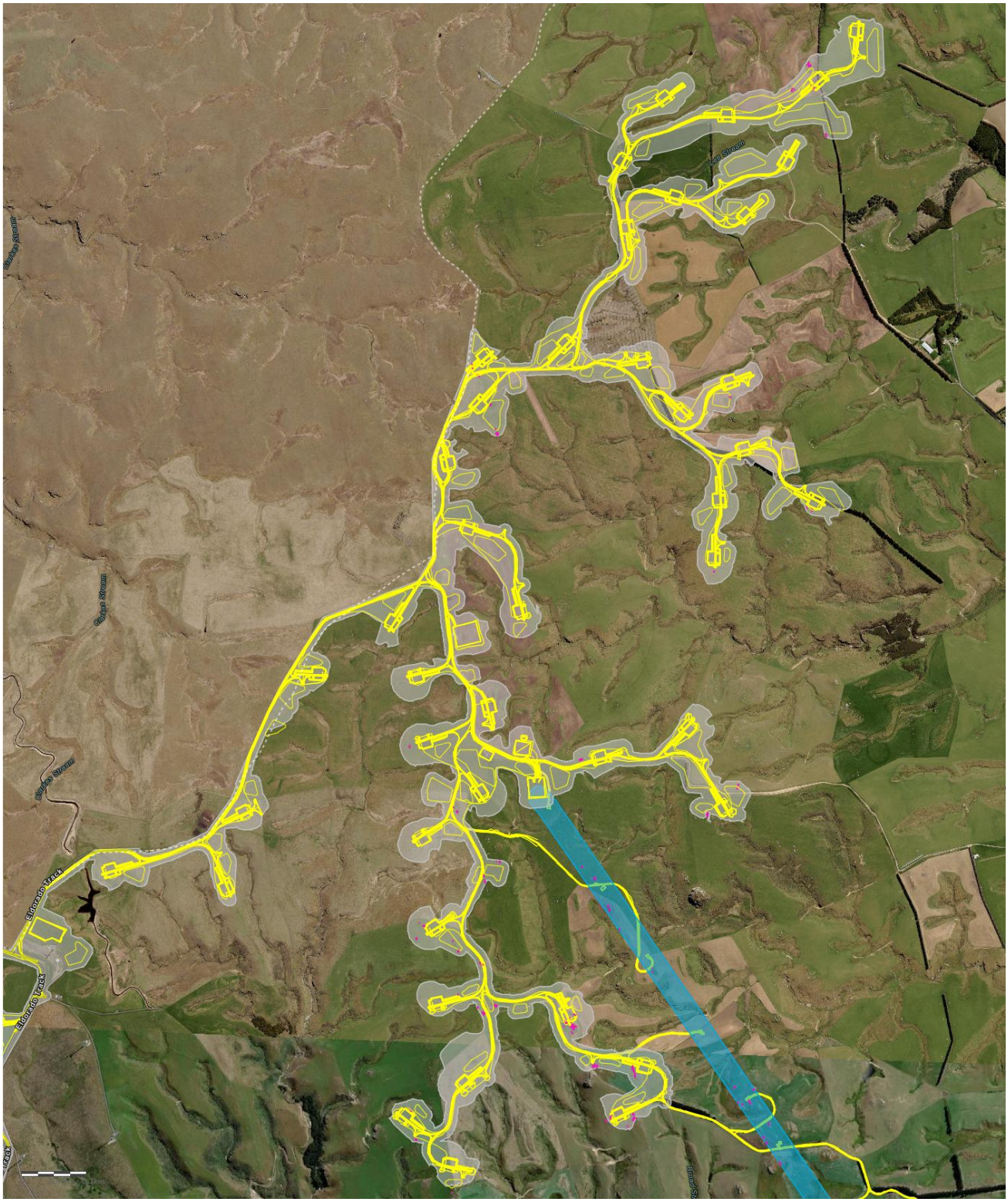

Figure 8. Northern extent of Stage 2 MWF layout (yellow) and Windfarm Development Area (grey), Transmission Line Corridor (blue), rock areas (pink).

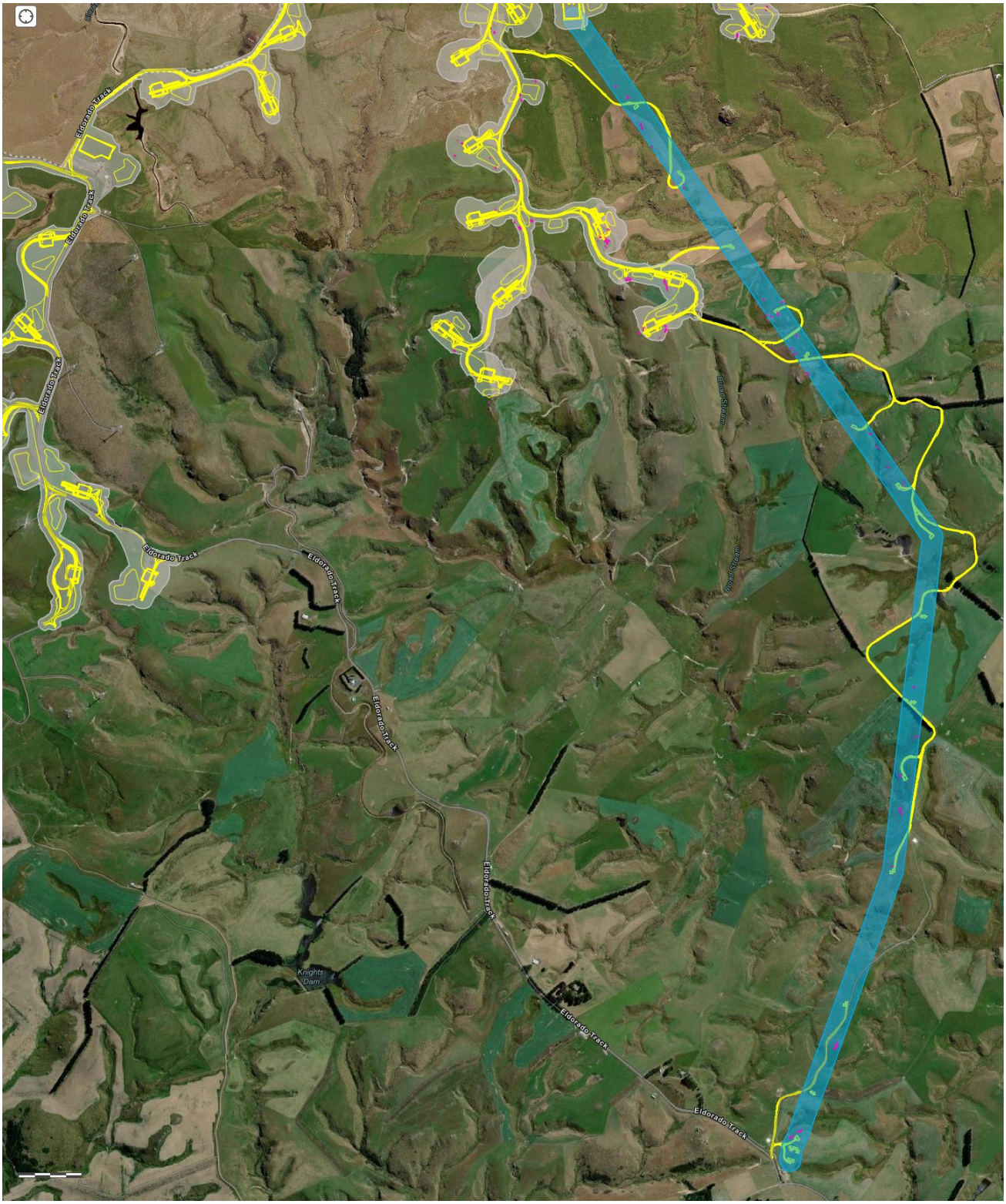

Figure 9. Central extent of Stage 2 MWF layout (yellow) and Windfarm Development Area (grey), Transmission Line Corridor (blue), rock areas (pink).

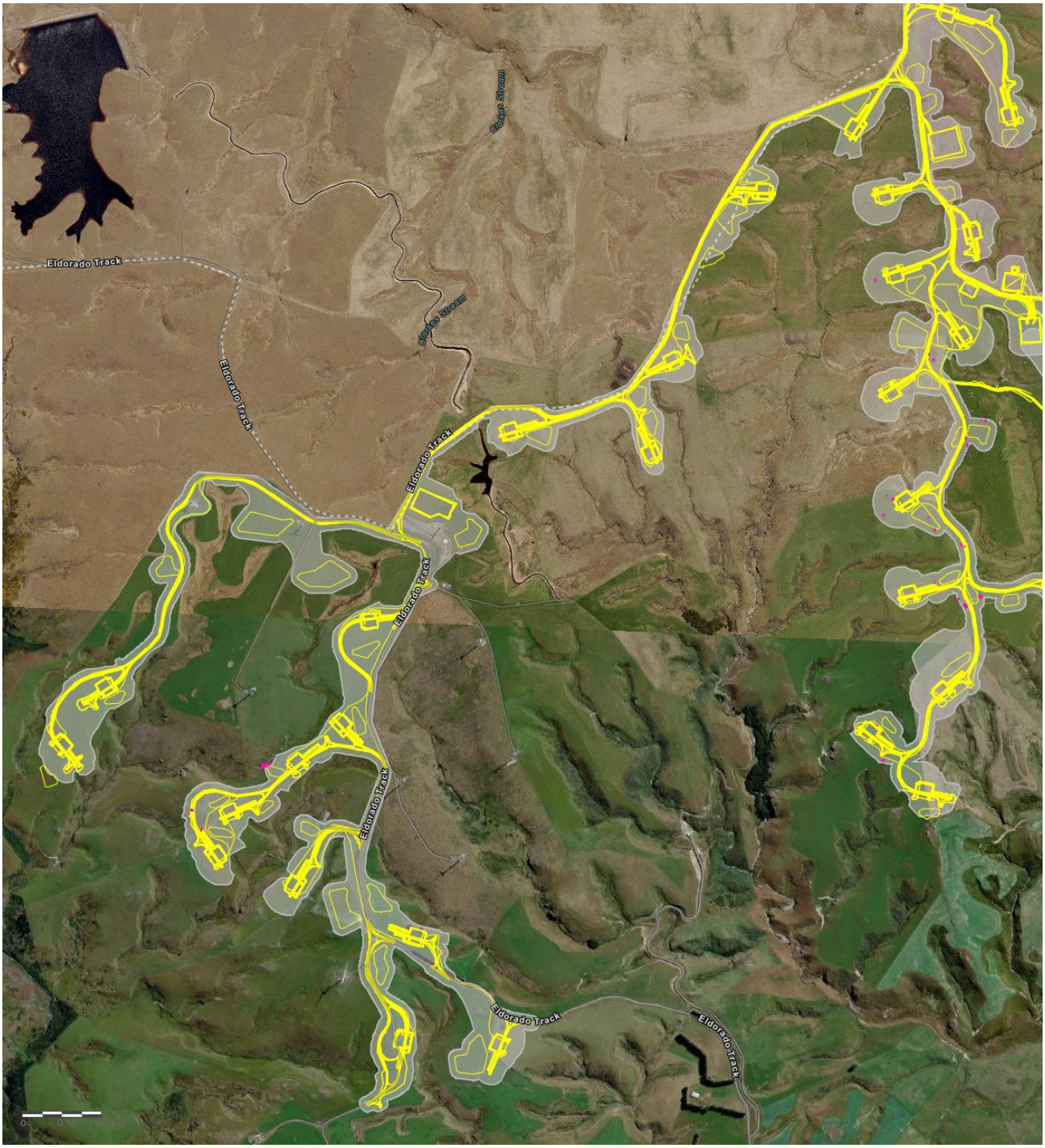

Figure 10. Southern extent of Stage 2 MWF layout (yellow), Windfarm Development Area (grey), rock areas (pink).

5.0 Lizard Survey Methodology

All potential lizard habitat types were assessed within the Stage 2 Wind Farm Development Area and Transmission Corridor via a comprehensive lizard survey. This was to determine the suitability and relative abundance of indigenous lizards within each habitat type (**Figure 11**).

An initial scoping survey was undertaken on 18 December 2024, which included assessing the quality and quantity of potential lizard habitats within the Stage 2 Wind Farm Development Area (WDA). Based on the available habitats a variety of detection methods were decided on by Dr Mandy Tocher and Mr Tony Payne. The goal was to maximise encounters of all potential lizard species and effectively sample all seven 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 survey timetable for each lizard survey method undertaken is provided in **Table 5**.

Table 5. Timetable for lizard survey

Method	Date Set / Survey	Date of checks
ACOs	11, 13, 14, and 21 March 2025	4 to 6 April 2025 and 13 to 15 April 2025
Gee minnow traps	22 March 2025	23 to 28 March 2025
VES/MHS – MWF site	10-11 April 2025	-
VES/MHS – transmission line corridor and substation	16 March and 11 April 2025	-

ACOs

ACOs were used at 66 focal sites over the Stage 2 WDA. These sites had moderate vegetation cover and provided sunny basking locations for any skinks residing within, sampling:

- 22 wetland margin areas;
- 33 areas of snow tussock grassland;
- 11 areas of rough pasture; and
- one area of forestry.

In total, 570 triple-stacked ACOs were set in clusters of 5, 10 or 20 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 grid using the catch-per-unit-effort (CPUE) indices from a mark-recapture survey.

All devices were left for up to 4 weeks and checked twice a week apart.

Gee's minnow traps

A total of 100 gee's minnow traps were used at 10 focal sites in clusters of 10 over the Stage 2 WDA (excluding the transmission line and substation). The size of clusters was undertaken to enable a measure of relative abundance of lizards. Gee's minnow traps sampled 8 wetlands and the surrounding margins, one area of indigenous shrubland and one area of snow tussock grassland. The sites selected were those with dense ground cover e.g., sedge lands, that could provide habitat for any common skink species present (e.g., tussock skink and McCann's skink) but more importantly, depleted populations of locally rare skink species, e.g., herbfield skink. Traps were open for six consecutive days during weather that was generally suitably for lizard activity. Traps were tucked into available vegetation to provide shade to lizards trapped, and/or vegetation was cut/pulled by hand and placed over the trap to provide shade. To further assist trapped lizards, a moistened sponge was inserted into the traps to provide cover and moisture to captured skinks; the sponge was re-moistened during daily checks, as required. Gee's minnow traps were baited with tinned pear that was replaced every second day.

Visual Encounter Survey or Manual Habitat Search

A total of 127 areas were searched via VES/MHS, sampling the following habitats:

- Snow tussock grassland – 7 locations;
- Wetland – 7 locations;
- Rough pasture – 32 locations;
- Rock (carins, outcrops) – 60 locations;
- Indigenous shrubland – 1 location;
- Pasture/ exotic vegetaion – 16 locations;
- Shelterbelt – 4 locations.

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. For skinks, faecal sign was noted (where present) on top of any cover present (e.g., fence posts, rocks or other farm litter) and for geckos, any sloughed skins were noted beneath rocks in areas of outcropping and/or in bushes in shrublands. Sign (faecal and skin) was way pointed, as well as detections of lizards themselves.

Weather conditions

The lizard survey was started at approximately 9 am each morning and undertaken during days with no rain >0.5 mm and with daytime temperatures ranging from 7°C to 26°C (**Table 6**). 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 Gee's minnow trap. Weather conditions during the survey period are shown in **Table 6**.

Table 6. Daily temperatures during the lizard survey

Date	Temperature °C[10]	Assessments carried out
23/3/25	13-17	Gee's minnow check
24/3/25	9-15	Gee's minnow check
25/3/25	11-17	Gee's minnow check
26/3/25	9-22	Gee's minnow check
27/3/25	9-15	Gee's minnow check
28/3/25	13-16	Gee's minnow check
4/4/25	21-26	ACO check 1
5/4/25	12-15	ACO check 1
6/4/25	9-19	ACO check 1
10/4/25	8-20	VES
11/4/25	14-23	VES
13/4/25	7-17	ACO check 2
14/4/25	11-19	ACO check 2
15/4/25	7-12	ACO check 2

Plate 4. Taking a spot temperature recording using a handheld thermometer during the lizard survey.

[10] Source: https://www.wunderground.com/history/daily/nz/mosgiel/NZDN and spot checks with handheld thermometer.

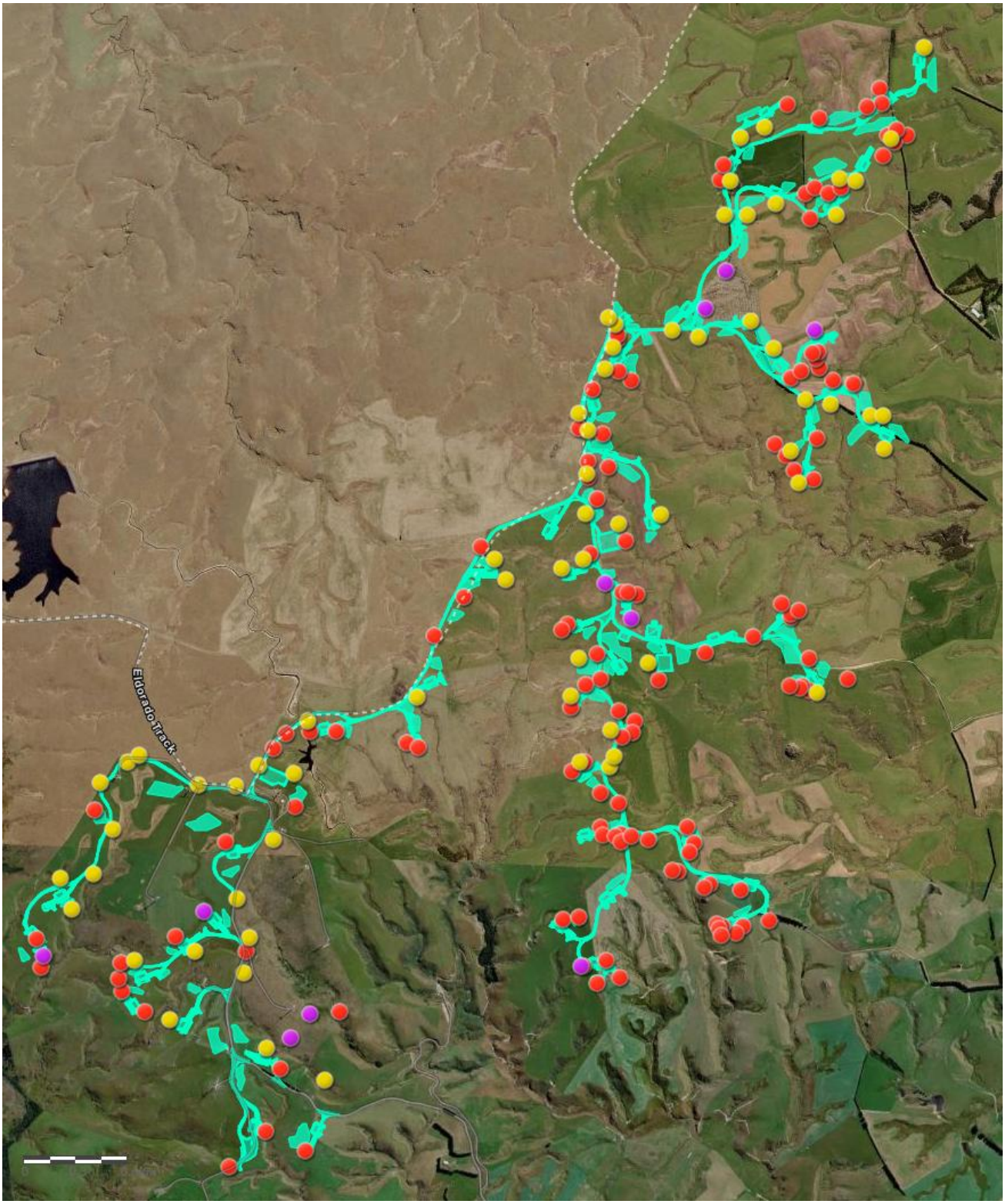

Figure 11. MWF Stage 2 layout (blue), ACO clusters (yellow), minnow traps (purple), Visual Encounter Survey (red).

6.0 Lizard Survey Results

A total of 181 lizards were recorded during the survey including 108 McCann's skinks, 66 tussock skinks, and 14 unidentified skinks (either McCann's skink or tussock skink). 130 lizards were recorded from ACOs, 7 from Gee's minnow traps, and 51 from VES/MHS.

ACOs had an average of 10% occupancy and a maximum of 75% where Site 38 (wetland) recorded 15 skinks from 20 ACO checks.

Gee's minnow trap sites had an average of 1% occupancy and a maximum of 5% at Site 7 (wetland) where 3 tussock skinks were recorded from 60 checks.

Lizards were recorded at 22 of the VES/MHS sites (18%), with a total of 50 McCann's skink and 1 tussock skink. The VES/MHS with the highest abundance of lizards was Site 18 (rough pasture) which recorded 8 McCann's skink.

The survey results reflected the general understanding of both McCann's skink and tussock skink abundance, habitat preferences, and occupancy relative to the works footprint. In general, McCann's skinks tend to be common and widespread over Otago and can persist even at the most degraded sites and tussock skink are less frequently encountered and restricted more to wetlands, snow tussock grassland and rough pasture. As expected, no lizards were recorded within exotic pasture or shelterbelts.

The results indicate that any other rarer potential lizard species known to the Ecological District such as kōrero gecko, jewelled gecko, herbfield skink or Burgan skink are highly unlikely to be present within the Stage 2 Windfarm Development Area 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 indigenous vegetation 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 (**Figures 12** to **14**). This is an assessment based on professional judgement where the following were considered:

- Representativeness: Typical structure, species composition (abundance) and indigenous representation.
- Rarity / distinctiveness: Species of conservation significance, distinctive ecological values.
- Diversity and pattern: Habitat diversity, species diversity and patterns in habitat use.
- Ecological context: Size, shape, ecological networks (e.g., linkages, pathways).

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, grazed exotic pasture and areas of cropping.

2. Low quality habitats are those that recorded no or very few lizards during the lizard survey estimated to be <10 lizards/ ha from a ≤5% (CPUE) habitat occupancy. Approximately 22.3 ha of low-quality habitats will be affected by the Stage 2 MWF and 462 m^2 by the transmission line corridor.

3. Medium quality habitats are those that recorded occasional lizards during the survey, estimated to be 400 lizards/ ha from a ≤25% to >5% (CPUE) habitat occupancy. Approximately 12.5 ha of medium quality habitats will be affected by the Stage 2 MWF and 0.37 ha by the transmission line corridor.

4. High-quality habitats are those that recorded the most lizards during the survey, estimated to be >400 lizards/ ha from >25% habitat occupancy. There is one 1,285 m^2 area of high-quality habitat that will be affected by the Stage 2 MWF layout and there is no high-quality habitat within the transmission line corridor. This includes an access road crossing a wetland between WTG20 and WTG 21 (red area in **Figure 12**). The extent of high-quality habitats that is affected is dramatically less than the consented layout which authorises works in the Scrappy Pines QEII area and the Thomas Block. Both of these areas have extensive high quality snow tussock habitat.

The survey indicates that the best habitats for lizards are snow tussock grassland and rough pasture which are of relatively similar quality, followed by wetlands and then rock (**Table 7**). Survey results for each method are provided in **Tables 8** to **10**.

Table 7. Habitat quality of each habitat type as indicated by each survey method.

Habitat type	ACOs	Gee's minnow	VES/ MHS
Snow tussock grassland	Low = 12 (36%) Moderate = 18 (55%) High = 3 (9%)	Low = 1 (100%) Moderate = 0 High = 0	Low = 3 (43%) Moderate = 3 (43%) High = 1 (14%)
Wetland	Low = 15 (71%) Moderate = 4 (19%) High = 2 (10%)	Low = 8 (100%) Moderate = 0 High = 0	Low = 6 (86%) Moderate = 1 (14%) High =
Rough pasture	Low = 5 (45.5%) Moderate = 5 (45.5%) High = 1 (9%)	-	Low = 4 (13%) Moderate = 28 (86%) High = 0
Rock	-	-	Low = 56 (93.5%) Moderate = 3 (5%) High = 1 (1.5%)
Indigenous shrubland	-	Low = 1 (100%) Moderate = 0% High = 0%	Low = 1 (100%) Moderate = 0 High = 0
Pasture/ exotic vegetation	-	-	Low = 16 (100%) Moderate = 0 High = 0
Shelterbelt	-	-	Low = 4 (100%) Moderate = 0 High = 0

Table 8. Lizard survey results for ACOs. Habitat quality is colour coded, survey locations within the Stage 2 layout are bold. Nil locations are outside the Stage 2 Development Area.

Label	ACOs	McCann's skink	Tussock skink	Unidentified skink	Occupancy (%)	Habitat	Habitat quality	Location	Within Stage 2 layout?	X	Y
1	10	0	0	0	0%	Snow tussock grassland	Low	Nil	No	169.8849263	-45.77806104
2	10	0	0	0	0%	Wetland	Low	Nil	No	169.8805006	-45.77636244
3	10	0	1	0	5%	Snow tussock grassland	Medium	Nil	No	169.8788414	-45.77245901
4	10	0	0	0	0%	Snow tussock grassland	Low	Road	No	169.879241	-45.77055818
5	10	0	2	0	10%	Snow tussock grassland	Medium	Road	No	169.8783773	-45.76851321
6	10	0	0	1	5%	Snow tussock grassland	Medium	Road	No	169.881081	-45.76545217
7	5	1	0	0	10%	Snow tussock grassland	Medium	Road	No	169.8782057	-45.76260054
8	5	0	0	1	10%	Snow tussock grassland	Medium	Road	No	169.8753947	-45.76251447
9	10	0	0	0	0%	Snow tussock grassland	Low	Road	No	169.8710066	-45.76099503
10	10	0	7	1	40%	Wetland	High	Road	No	169.8700997	-45.761343
11	10	0	4	1	25%	Snow tussock grassland	Medium	Road	No	169.8679995	-45.7623965
12	10	0	2	2	20%	Snow tussock grassland	Medium	Road	No	169.8689329	-45.76489263
13	10	0	1	0	5%	Snow tussock grassland	Medium	Road	No	169.8674751	-45.76716693
14	10	0	3	2	25%	Rough pasture	Medium	Road	No	169.8650236	-45.76747752

Label	ACOs	McCann's skink	Tussock skink	Unidentified skink	Occupancy (%)	Habitat	Habitat quality	Location	Within Stage 2 layout?	X	Y
15	10	0	5	0	25%	Snow tussock grassland	Medium	SFD	No	169.8658283	-45.76909781
16	10	0	0	0	0%	Snow tussock grassland	Low	CZ	No	169.8751817	-45.77122754
17	10	0	0	2	10%	Rough pasture	Medium	Road	No	169.8705668	-45.77173173
18	10	0	0	0	0%	Snow tussock grassland	Low	Nil	No	169.8732312	-45.77485707
19	10	0	0	0	0%	Snow tussock grassland	Low	Road	No	169.8798777	-45.76154297
20	10	1	1	1	15%	Snow tussock grassland	Medium	CZ	No	169.8825813	-45.76193218
21	10	0	0	0	0%	Snow tussock grassland	Low	Road	No	169.8835979	-45.75919827
22	10	0	0	0	0%	Wetland	Low	Nil	No	169.8918591	-45.7579033
23	10	0	2	0	10%	Wetland	Medium	Nil	No	169.8986075	-45.75176867
24	10	7	1	2	50%	Snow tussock grassland	High	SFD	No	169.8976889	-45.75069625
25	10	0	1	0	5%	Rough pasture	Low	Road	No	169.9046157	-45.74832021
26	5	1	1	0	20%	Wetland	Medium	Nil	No	169.9044044	-45.75067718
27	**10**	**3**	**0**	**0**	**15%**	**Snow tussock grassland**	**Medium**	**CZ**	**Yes**	**169.902833**	**-45.7511338**
28	**10**	**1**	**0**	**0**	**5%**	**Rough pasture**	**Low**	**SFD**	**Yes**	**169.90404**	**-45.7559202**
29	**10**	**1**	**0**	**0**	**5%**	**Rough pasture**	**Low**	**CZ**	**Yes**	**169.903396**	**-45.7578964**
30	**10**	**1**	**1**	**0**	**10%**	**Rough pasture**	**Medium**	**SFD**	**Yes**	**169.906459**	**-45.7596873**
31	5	0	0	0	0%	Wetland	Low	Nil	No	169.906754	-45.76103457
32	5	0	0	0	0%	Wetland	Low	Road	No	169.9063571	-45.76160343

Label	ACOs	McCann's skink	Tussock skink	Unidentified skink	Occupancy (%)	Habitat	Habitat quality	Location	Within Stage 2 layout?	X	Y
33	10	0	0	0	0%	Snow tussock grassland	Low	CZ	No	169.9041737	-45.76137514
34	10	0	0	0	0%	Wetland	Low	Nil	No	169.9093558	-45.75612419
35	10	0	0	0	0%	Wetland	Low	Nil	No	169.922048	-45.75766622
36	10	0	0	0	0%	Wetland	Low	Nil	No	169.9070985	-45.74886976
37	10	10	1	0	55%	Rough pasture	High	Road	No	169.9046424	-45.74617262
38	10	4	0	0	20%	Snow tussock grassland	Medium	CZ	No	169.9102659	-45.74833651
38	**10**	**1**	**13**	**1**	**75%**	**Wetland**	**High**	**Road**	**Yes**	**169.904942**	**-45.7439235**
39	10	0	0	0	0%	Snow tussock grassland	Low	Road	No	169.9040942	-45.74300626
40	**5**	**0**	**0**	**0**	**0%**	**Snow tussock grassland**	**Low**	**Road**	**Yes**	**169.906052**	**-45.7407188**
41	**5**	**1**	**3**	**0**	**40%**	**Snow tussock grassland**	**High**	**SFD**	**Yes**	**169.906626**	**-45.7395237**
42	**10**	**2**	**0**	**0**	**10%**	**Snow tussock grassland**	**Medium**	**CZ**	**Yes**	**169.906798**	**-45.7383706**
43	10	4	2	0	30%	Snow tussock grassland	High	SFD	No	169.9062453	-45.73802428
44	**10**	**3**	**0**	**0**	**15%**	**Snow tussock grassland**	**Medium**	**Road**	**Yes**	**169.911046**	**-45.7386945**
45	5	0	0	0	0%	Snow tussock grassland	Low	SFD	Yes	169.9130581	-45.73898649
46	**10**	**3**	**0**	**0**	**15%**	**Forestry**	**Medium**	**CZ**	**Yes**	**169.917073**	**-45.7381815**
47	5	0	0	0	0%	Wetland	Low	Road	No	169.918727	-45.73962389
48	**20**	**4**	**1**	**0**	**13%**	**Snow tussock grassland**	**Medium**	**Road**	**Yes**	**169.921174**	**-45.7422994**

Label	ACOs	McCann's skink	Tussock skink	Unidentified skink	Occupancy (%)	Habitat	Habitat quality	Location	Within Stage 2 layout?	X	Y
49	10	0	2	0	10%	Snow tussock grassland	Medium	SFD	No	169.9200205	-45.74503813
50	**10**	**0**	**3**	**0**	**15%**	**Snow tussock grassland**	**Medium**	**CZ**	**Yes**	**169.920596**	**-45.7467037**
52	10	0	0	0	0%	Snow tussock grassland	Low	Nil	No	169.9269973	-45.74481347
53	5	0	0	0	0%	Wetland	Low	Road	No	169.9259834	-45.74314568
54	5	0	0	0	0%	Wetland	Low	Road	No	169.9269598	-45.74312696
55	5	0	0	0	0%	Wetland	Low	Nil	No	169.9230732	-45.7425013
56	5	0	0	0	0%	Wetland	Low	Nil	No	169.9166881	-45.73259598
57	10	5	0	0	25%	Rough pasture	Medium	Road	No	169.9150198	-45.73259598
58	5	1	0	0	10%	Wetland	Medium	CZ	No	169.9189331	-45.73200436
59	10	0	3	0	15%	Wetland	Medium	Road	No	169.915456	-45.73076969
60	5	0	0	0	0%	Wetland	Low	Road	No	169.916207	-45.72848361
61	5	0	0	0	0%	Rough pasture	Low	Nil	No	169.9180711	-45.72798744
62	5	0	0	0	0%	Wetland	Low	Road	No	169.9237333	-45.7306948
63	5	0	0	0	0%	Wetland	Low	Nil	No	169.9249188	-45.73079591
64	10	0	0	0	0%	Rough pasture	Low	CZ	No	169.9234878	-45.73254984
65	5	0	0	0	0%	Snow tussock grassland	Low	SFD	No	169.9275796	-45.72856412
66	5	2	0	0	20%	Rough pasture	Medium	CZ	No	169.9300746	-45.72378135

Table 9. Lizard survey results for Gee's minnows. Habitat quality is colour coded, survey locations within the Stage 2 layout are bold. Nil locations are outside the Stage 2 Development Area.

Label	McCann's skink	Tussock skink	Occupancy (%)	Habitat	Habitat quality	Location	Within Stage 2 layout?	X	Y
1	0	0	0%	Snow tussock grassland	Low	Nil	No	169.882381	-45.77588844
2	0	1	2%	Wetland	Low	Nil	No	169.8837436	-45.77463128
3	0	0	0%	Wetland	Low	CZ	No	169.8759437	-45.76914584
4	0	0	0%	Indigenous shrubland	Low	CZ	No	169.8637504	-45.77150351
5	0	1	2%	Wetland	Low	Road	No	169.9043054	-45.77206823
6	1	0	2%	Wetland	Low	CZ	No	169.9079819	-45.75377724
7	0	3	5%	Wetland	Low	Road	No	169.9060447	-45.75195908
8	0	0	0%	Wetland	Low	Road	No	169.9135956	-45.73754847
9	**0**	**0**	0%	**Wetland**	**Low**	**Road**	**Yes**	**169.915226**	**-45.7355641**
10	1	0	2%	Wetland	Low	CZ	No	169.9218729	-45.73864547

Table 10. Lizard survey results for Visual Encounter Surveys. Habitat quality is colour coded, survey locations within the Stage 2 layout are bold. Nil locations are outside the Stage 2 Development Area.

Label	McCann's skink	Tussock skink	Habitat	Habitat quality	Location	Within Stage 2 layout?	X	Y
1	0	0	Rough pasture	Low	CZ	No	169.8804677	-45.78076002
2	**0**	**0**	**Rough pasture**	**Low**	**Road**	**Yes**	**169.881541**	**-45.77745647**
3	0	0	Rough pasture	Low	CZ	No	169.8712918	-45.77448759
4	**0**	**0**	**Rock**	**Low**	**Road**	**Yes**	**169.869628**	**-45.77337127**
5	**0**	**0**	**Rock**	**Low**	**Road**	**Yes**	**169.869313**	**-45.77261638**
6	**0**	**0**	**Rock**	**Low**	**Road**	**Yes**	**169.869627**	**-45.77204389**
7	0	0	Rock	Low	SFD	No	169.8736822	-45.77052191
8	0	0	Snow tussock grassland	Low	Road	No	169.8790413	-45.77128525
9	0	0	Wetland	Low	Nil	No	169.8775124	-45.76549636
10	0	0	Rough pasture	Low	SFD	No	169.8676285	-45.76382545

Label	McCann's skink	Tussock skink	Habitat	Habitat quality	Location	Within Stage 2 layout?	X	Y
11	**0**	**0**	**Pasture/ exotic vegetation**	**Low**	**CZ**	**Yes**	**169.863307**	**-45.77065475**
12	0	0	Indigenous shrubland	Low	Nil	No	169.8635435	-45.77212528
13	0	0	Rock	High	Nil	No	169.8860101	-45.77453626
14	0	0	Pasture/ exotic vegetation	Low	SFD	No	169.8826842	-45.76368084
15	1	0	Rough pasture	Low	Road	No	169.8811151	-45.76059708
16	**0**	**0**	**Pasture/ exotic vegetation**	**Low**	**Road**	**Yes**	**169.882032**	**-45.7598598**
17	0	0	Rough pasture	Low	CZ	No	169.8837866	-45.75971758
18	**0**	**0**	**Pasture/ exotic vegetation**	**Low**	**SFD**	**Yes**	**169.885753**	**-45.75976249**
19	**8**	**0**	**Rough pasture**	**Medium**	**CZ**	**Yes**	**169.891163**	**-45.76030142**
20	**5**	**0**	**Rough pasture**	**Medium**	**CZ**	**Yes**	**169.891965**	**-45.76055404**
21	1	0	Snow tussock grassland	Medium	Road	No	169.8930965	-45.75475469
22	**6**	**0**	**Rough pasture**	**Medium**	**SFD**	**Yes**	**169.895317**	**-45.75265487**
23	0	0	Snow tussock grassland	Low	Road	No	169.8966344	-45.75006836
25	1	0	Rough pasture	Low	Nil	No	169.9075671	-45.74975018
26	0	0	Rough pasture	Low	SFD	No	169.9054374	-45.74756033
26	1	0	Rock	Low	Nil	No	169.9048527	-45.75031167
27	**1**	**0**	**Rock**	**Low**	**CZ**	**Yes**	**169.907366**	**-45.75244141**
28	**0**	**0**	**Rock**	**Low**	**CZ**	**Yes**	**169.90767**	**-45.75240024**
29	0	0	Rough pasture	Low	CZ	No	169.9084038	-45.75256306
30	**0**	**0**	**Rough pasture**	**Low**	**CZ**	**Yes**	**169.903213**	**-45.75407852**

Label	McCann's skink	Tussock skink	Habitat	Habitat quality	Location	Within Stage 2 layout?	X	Y
31	0	0	Rock	Low	CZ	No	169.9027986	-45.75438731
32	0	0	Wetland	Low	Road	No	169.9054281	-45.75569086
33	1	0	Rock	Low	Road	No	169.9056592	-45.75697634
34	0	0	Wetland	Low	Road	No	169.9046195	-45.75728077
35	**0**	**0**	**Rough pasture**	**Low**	**CZ**	**Yes**	**169.903439**	**-45.75845972**
36	0	0	Rock	Low	Road	No	169.9071032	-45.75863563
37	0	0	Rock	Low	SFD	No	169.9082592	-45.75920638
38	**0**	**0**	**Pasture/ exotic vegetation**	**Low**	**SFD**	**Yes**	**169.908128**	**-45.75979023**
39	0	0	Rock	Low	Road	No	169.9073446	-45.76004285
40	0	0	Rough pasture	Low	CZ	No	169.9099353	-45.75700552
41	0	0	Rough pasture	Low	Nil	No	169.9136046	-45.75557763
42	**1**	**0**	**Rough pasture**	**Low**	**Road**	**Yes**	**169.917195**	**-45.75477631**
43	**0**	**0**	**Pasture/ exotic vegetation**	**Low**	**SFD**	**Yes**	**169.92008**	**-45.75376665**
44	**0**	**0**	**Pasture/ exotic vegetation**	**Low**	**CZ**	**Yes**	**169.920074**	**-45.75358699**
45	0	0	Rough pasture	Low	CZ	No	169.9206161	-45.7533961
46	**0**	**0**	**Rough pasture**	**Low**	**CZ**	**Yes**	**169.919329**	**-45.75303864**
47	0	0	Rough pasture	Low	Road	No	169.9214143	-45.75591985
48	2	0	Rock	Low	Nil	No	169.9199659	-45.75737018
49	**0**	**0**	**Rock**	**Low**	**SFD**	**Yes**	**169.920685**	**-45.75748246**
50	3	0	Rock	Medium	Nil	No	169.9209798	-45.7573103
51	0	0	Rough pasture	Low	CZ	No	169.9213821	-45.75757977
52	0	0	Rough pasture	Low	Nil	No	169.9242843	-45.75700339
53	0	0	Wetland	Low	Nil	No	169.9045087	-45.7613619
54	1	0	Rock	Low	CZ	No	169.9036611	-45.76187649

Label	McCann's skink	Tussock skink	Habitat	Habitat quality	Location	Within Stage 2 layout?	X	Y
55	2	0	Rock	Low	SFD	No	169.905713	-45.7629936
56	**1**	**0**	**Rock**	**Low**	**Road**	**Yes**	**169.907102**	**-45.76348291**
57	0	0	Rock	Low	Road	No	169.9057251	-45.76476184
58	0	0	Rock	Low	Road	No	169.9059182	-45.76514729
59	**0**	**0**	**Pasture/ exotic vegetation**	**Low**	**Road**	**Yes**	**169.907274**	**-45.76512398**
60	0	0	Rock	Low	SFD	No	169.9080093	-45.76521753
61	0	0	Rock	Low	Nil	No	169.9068184	-45.76524747
62	0	0	Rock	Low	SFD	No	169.9072368	-45.76554124
63	**0**	**0**	**Rock**	**Low**	**SFD**	**Yes**	**169.909316**	**-45.76540652**
64	0	0	Rock	Low	Road	No	169.9122392	-45.76475911
65	**0**	**0**	**Rock**	**Low**	**CZ**	**Yes**	**169.912722**	**-45.76558053**
66	**0**	**0**	**Rock**	**Low**	**CZ**	**Yes**	**169.912419**	**-45.76601836**
67	0	0	Rock	Low	Nil	No	169.9115042	-45.76707552
68	0	0	Rock	Low	Nil	No	169.9110831	-45.7669988
69	0	0	Rock	Low	Road	No	169.9139477	-45.76775283
70	0	0	Rock	Low	SFD	No	169.9135427	-45.76795116
71	0	0	Rock	Low	CZ	No	169.9162652	-45.76796987
72	0	0	Rock	Low	Nil	No	169.9183922	-45.76966498
73	0	0	Rock	Low	CZ	No	169.916351	-45.76995124
74	0	0	Rock	Low	CZ	No	169.9159057	-45.77031233
75	**0**	**0**	**Rock**	**Low**	**CZ**	**Yes**	**169.914932**	**-45.76997369**
76	0	0	Rock	Low	CZ	No	169.9146746	-45.77007847
77	0	0	Rock	Low	Nil	No	169.9144654	-45.76987453
78	0	0	Rock	Low	Nil	No	169.9147819	-45.77043207
79	0	0	Rock	Low	Nil	No	169.9047564	-45.74638866
80	0	0	Rock	Low	Road	No	169.904751	-45.74556321
81	2	0	Rough pasture	Low	CZ	No	169.9062544	-45.74584304
82	4	1	Snow tussock grassland	High	SFD	No	169.905789	-45.74411351
83	0	0	Wetland	Medium	Nil	No	169.9040671	-45.74381495
84	**5**	**0**	**Snow tussock grassland**	**Medium**	**Road**	**Yes**	**169.905053**	**-45.74177088**

Label	McCann's skink	Tussock skink	Habitat	Habitat quality	Location	Within Stage 2 layout?	X	Y
85	0	0	Snow tussock grassland	Low	CZ	No	169.9070135	-45.74083867
86	0	0	Rock	Low	SFD	No	169.9080059	-45.74129354
87	0	0	Rock	Low	Nil	No	169.9070188	-45.73913893
88	**1**	**0**	**Rock**	**Low**	**Road**	**Yes**	**169.906909**	**-45.73888809**
89	0	0	Wetland	Low	Road	No	169.9247321	-45.74147699
90	0	0	Rough pasture	Medium	Nil	No	169.9231175	-45.74126172
91	0	0	Rock	Low	Nil	No	169.9221894	-45.74064024
92	**0**	**0**	**Rock**	**Low**	**SFD**	**Yes**	**169.921943**	**-45.74017226**
93	**0**	**0**	**Rock**	**Low**	**SFD**	**Yes**	**169.922074**	**-45.73981471**
94	**0**	**0**	**Rock**	**Low**	**SFD**	**Yes**	**169.921709**	**-45.73984279**
95	0	0	Pasture/ exotic vegetation	Low	Road	No	169.920741	-45.74080872
96	0	0	Rough pasture	Low	Road	No	169.9200812	-45.74115689
97	0	0	Rough pasture	Low	CZ	No	169.9219469	-45.74433438
98	0	0	Rock	Medium	Nil	No	169.9188651	-45.74464885
99	1	0	Rock	Medium	Nil	No	169.9197127	-45.74525531
100	0	0	Snow tussock grassland	Medium	CZ	No	169.920292	-45.74603022
101	**0**	**0**	**Rough pasture**	**Low**	**SFD**	**Yes**	**169.921762**	**-45.74652436**
102	0	0	Pasture/ exotic vegetation	Low	Road	No	169.9147133	-45.73071469
103	0	0	Shelterbelt	Low	CZ	No	169.9149816	-45.72995267
104	0	0	Rough pasture	Low	Road	No	169.9197761	-45.72682888
105	0	0	Pasture/ exotic vegetation	Low	CZ	No	169.9221553	-45.72751043
106	**0**	**0**	**Rock**	**Low**	**SFD**	**Yes**	**169.92583**	**-45.72690191**
107	0	0	Rock	Low	SFD	No	169.9267231	-45.72598255
108	**0**	**0**	**Rock**	**Low**	**Road**	**Yes**	**169.926935**	**-45.72672965**
109	0	0	Rough pasture	Low	SFD	No	169.9276216	-45.72841665

Label	McCann's skink	Tussock skink	Habitat	Habitat quality	Location	Within Stage 2 layout?	X	Y
110	1	0	Rock	Low	SFD	No	169.9273534	-45.72840542
111	0	0	Rock	Low	SFD	No	169.9277906	-45.72877989
112	0	0	Rough pasture	Low	Nil	No	169.9269993	-45.72948929
113	**0**	**0**	**Shelterbelt**	**Low**	**SFD**	**Yes**	**169.928029**	**-45.7281358**
114	**0**	**0**	**Rock**	**Low**	**SFD**	**Yes**	**169.928791**	**-45.7284541**
115	0	0	Pasture/ exotic vegetation	Low	Road	No	169.921769	-45.73118183
116	1	0	Rough pasture	Low	SFD	No	169.9228312	-45.73149636
117	0	0	Rough pasture	Low	Road	No	169.9237485	-45.73118183
118	0	0	Shelterbelt	Low	Road	No	169.9211092	-45.73145143
119	0	0	Shelterbelt	Low	Road	No	169.921474	-45.73277696
120	0	0	Rock	Low	SFD	No	169.9040503	-45.76953856
121	**0**	**0**	**Rock**	**Low**	**CZ**	**Yes**	**169.902859**	**-45.76964333**
122	0	0	Wetland	Low	Road	No	169.9043776	-45.7720905
123	0	0	Rock	Low	SFD	No	169.9053914	-45.7730147
124	0	0	Pasture/ exotic vegetation	Low	Nil	No	169.9071617	-45.77265924
125	0	0	Pasture/ exotic vegetation	Low	CZ	No	169.9061425	-45.77179116
126	0	0	Pasture/ exotic vegetation	Low	SFD	No	169.8834074	-45.78177761
127	0	0	Pasture/ exotic vegetation	Low	Road	No	169.8777318	-45.78257821

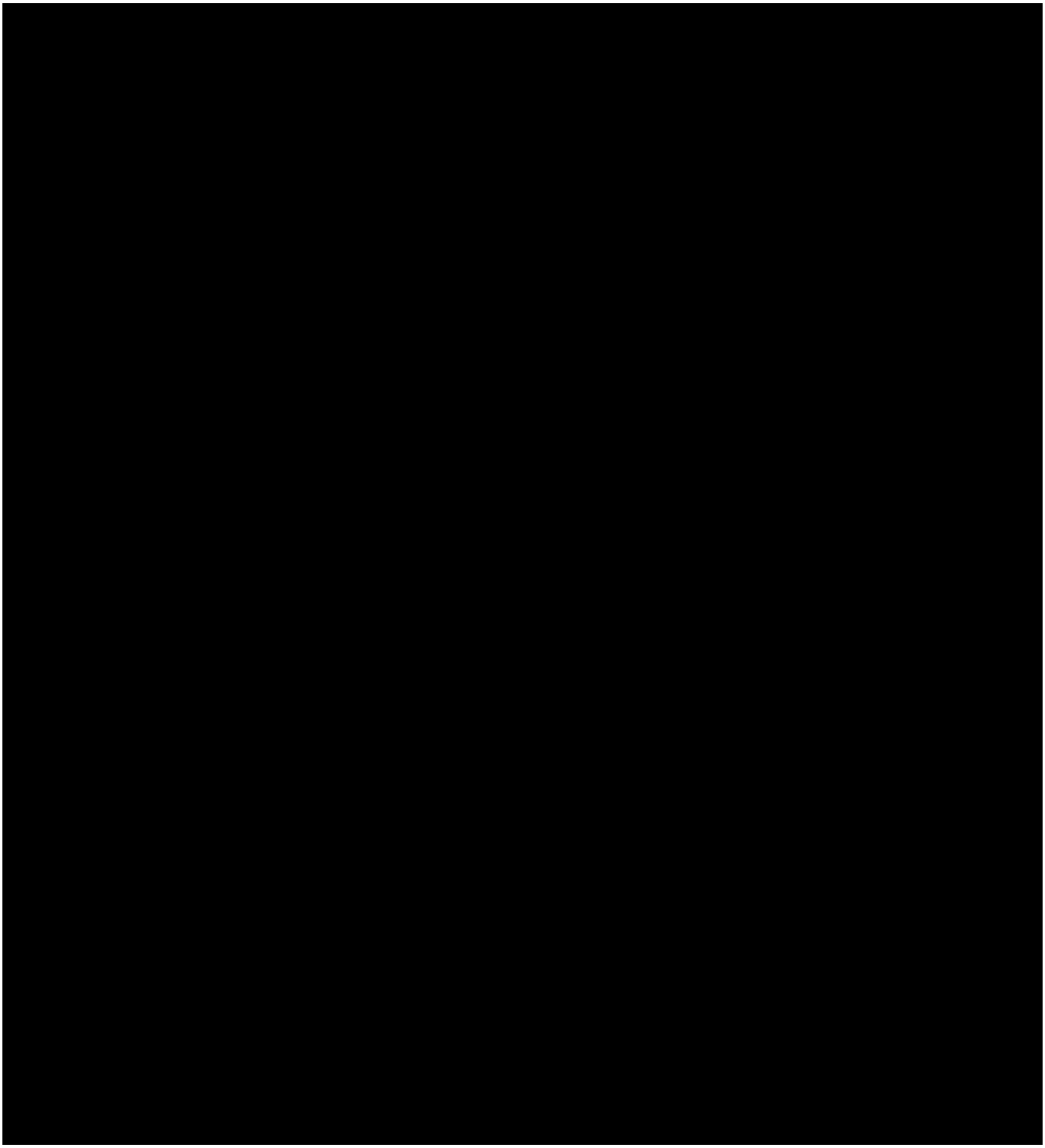

Figure 12. Habitat quality within the northern extent of the Stage 2 MWF layout. No habitat (yellow), poor quality habitat (green), moderate quality habitat (orange), high quality habitat (red). Location of ACO, Gee's minnow or VES/MHS survey (circle) and habitat quality result (green=low quality, orange = moderate quality, red = high quality). Contingency Zone (white).

Figure 13. Habitat quality within the central extent of the Stage 2 MWF layout and Transmission Line layout. No habitat within Stage 2 MWF layout (yellow), No habitat within Transmission Corridor and access tracks (blue), poor quality habitat (green), moderate quality habitat (orange). Location of ACO, Gee's minnow or VES/MHS survey (circle) and habitat quality result (green=low quality, orange = moderate quality, red = high quality). Contingency Zone (white).

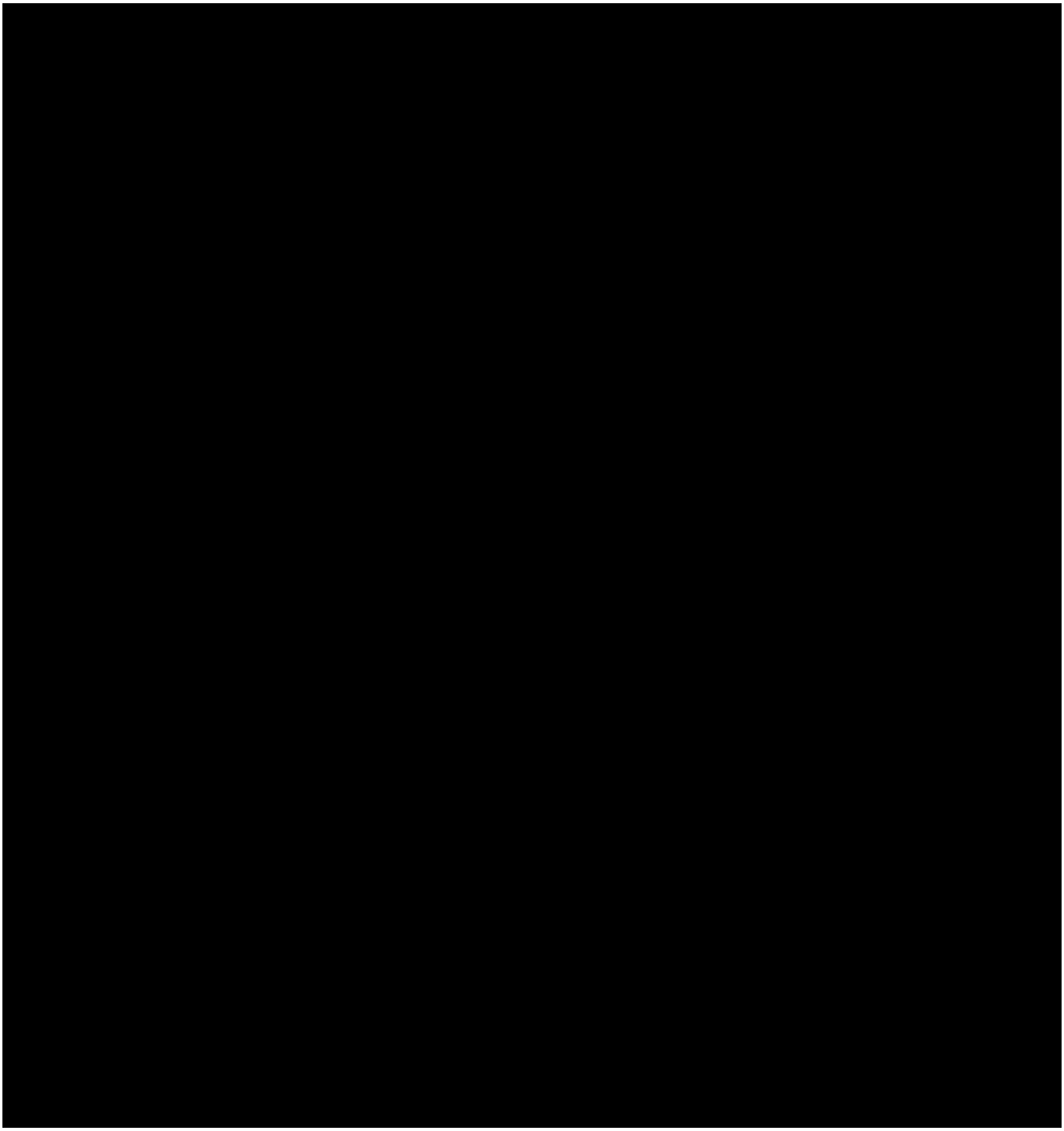

Figure 14. Habitat quality within the northern extent of the Stage 2 MWF layout. No habitat (yellow), poor quality habitat (green), moderate quality habitat (orange). Location of ACO, Gee's minnow or VES/MHS survey (circle) and habitat quality result (green=low quality, orange = moderate quality, red = high quality). Contingency Zone (white).

7.0 Project Description

The proposed Stage 2 and transmission line layout and works are described in detail within the Civil Engineering Assessment Report (Riley Consultants Ltd 2025). This assessment relies on the Civil Engineering Assessment Report in this regard, and it should be read in conjunction with this report. Material changes required to deliver Stage 2 include:

- Revised 'Proposed Turbine Locations and CZs
- Amendment to the consented roading and platform layout (and sizes) to suit the amended CZs, including removal of the Wind Farm Development Buffer areas within Stage 2.

Riley Consultants Ltd have reviewed the Land Use Resource Consent conditions and Table 2 of their report outlines the principal civil engineering conditions which require amendment for the delivery of the Project, along with reasons for this. Of note:

- Consent Condition 25i) requires all facilities and infrastructure to be inside the Wind Farm Development Area. There are five turbines where proposed earthworks associated with access tracks and hardstands are outside the Wind Farm Development Area, these are:
    - WTG 7. The blade and crane boom assembly areas encroach c. 950 m^2 beyond the Wind Farm Development Area boundary into managed pasture which has no lizard habitat.
    - WTG 36. The access track linking Turbine 36 and 37 encroaches beyond the Wind Farm Development Area by c. 1,950 m^2 into managed pasture which has no lizard habitat.
    - WTG 39. The proposed position of the hardstand, access track and earthworks batters encroach c. 3,600 m^2 beyond the Wind Farm Development Area into managed pasture which has no lizard habitat.
    - WTG 50. The access track approaching Turbine 50 encroaches beyond the Wind Farm Development Area by c. 2,400 m^2. Approximately, 850 m^2 is within pasture with minor hard tussock (*Festuca novae-zelandiae*) and golden spaniard (*Aciphylla aurea*) and embedded rocks. A Visual Encounter Survey (VES) was undertaken in this area (VES site 5), and it is of relatively poor quality habitat (**Plate 5**). The balance 1,550 m^2 is within managed pasture which has no lizard habitat.
    - WTG 52. The proposed position of the hardstand, access track and earthworks batters encroach c. 1,480 m^2 beyond the Wind Farm Development Area. Approximately, 120 m^2 is within grazed pasture with minor hard tussock. VES site 2 was undertaken in this area, and it is of relatively poor quality habitat (**Plate 6**). The balance 1,360 m^2 is within managed pasture which has no lizard habitat.
- Consent condition 25i)d) requires all hardstands to be located within the CZs as depicted on the Wind Farm Layout Plan (BMP W07190/1) with a maximum area of 1,400 m^2. A realistic 2025 equivalent of the consented layout includes 47 turbines, with an total area of 6.5 ha (65,800 m^2). The proposed 44 Stage 2 hardstands each have an area of 1855 m^2, with a total area of 8.1 ha (81,620 m^2). An increase in the of c. 1.6 ha (15,820 m^2).
- Portions of potential turbine locations lie outside of the consented CZs at:

- WTG 20. The proposed position of the hardstand, access track and earthworks batters encroach c. 6,700 m^2 beyond the consented CZ. Approximately 5,700 m^2 is within a pasture, hard tussock, golden spaniard mosaic. VES site 83 was undertaken in this area and it is of moderate to high quality habitat (**Plate 7**). The balance c. 1,000 m^2 is within an existing access track.
- WTG 39. The changes are described above.
- WTG 40. The proposed position of the hardstand, access track and earthworks batters encroach c. 2,700 m^2 beyond the consented CZ within managed pasture which has no lizard habitat.
- WTG 47 . The proposed position of the hardstand encroaches c. 1,700 m^2 beyond the consented CZ within managed pasture which has no lizard habitat.
- WTG 52. The changes are described above.

- Consent condition 25i)b)ii) authorised a 12m track width during construction and requires all finished tracks to be 5.0 m post-construction. The proposed post-construction track width is 5.5 m (with an allowance for widening to 9.5 m on bends) The actual total access track length will depend on which of the 54 potential locations will be constructed, and is estimated as a total 31 km of tracks (the existing condition 25 provides for a maximum of 37 km of tracks). This would result in an increased post-construction track width of 1.55 ha when compared to a realistic consented layout.

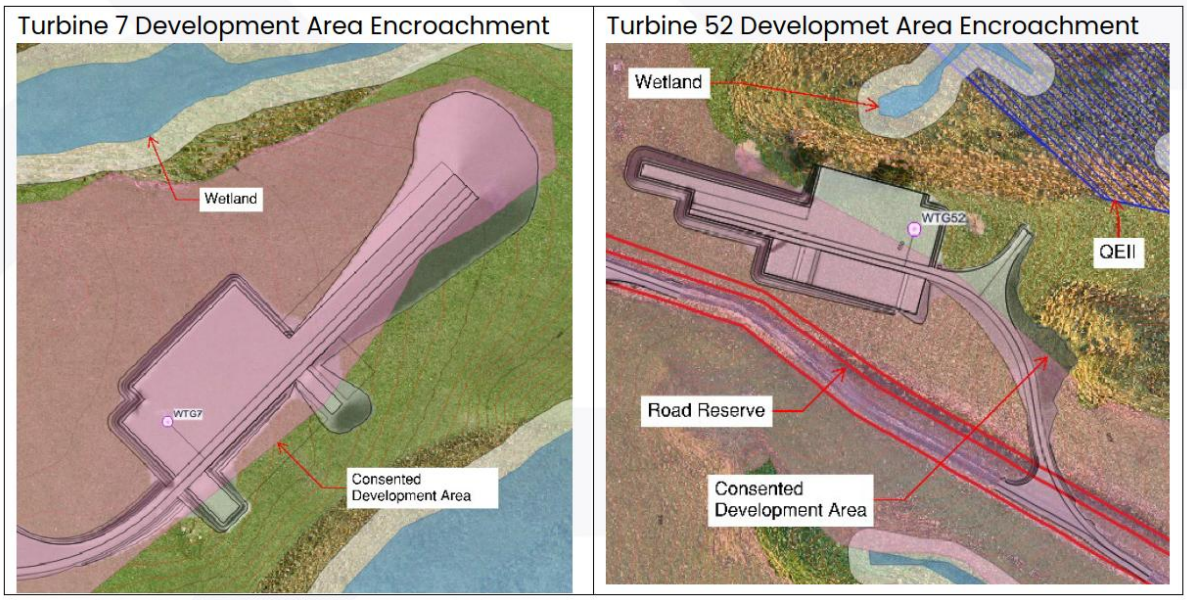

Figure 15. Proposed earthworks outside the consented development area. Figure provided courtesy of Riley Consultants Ltd.

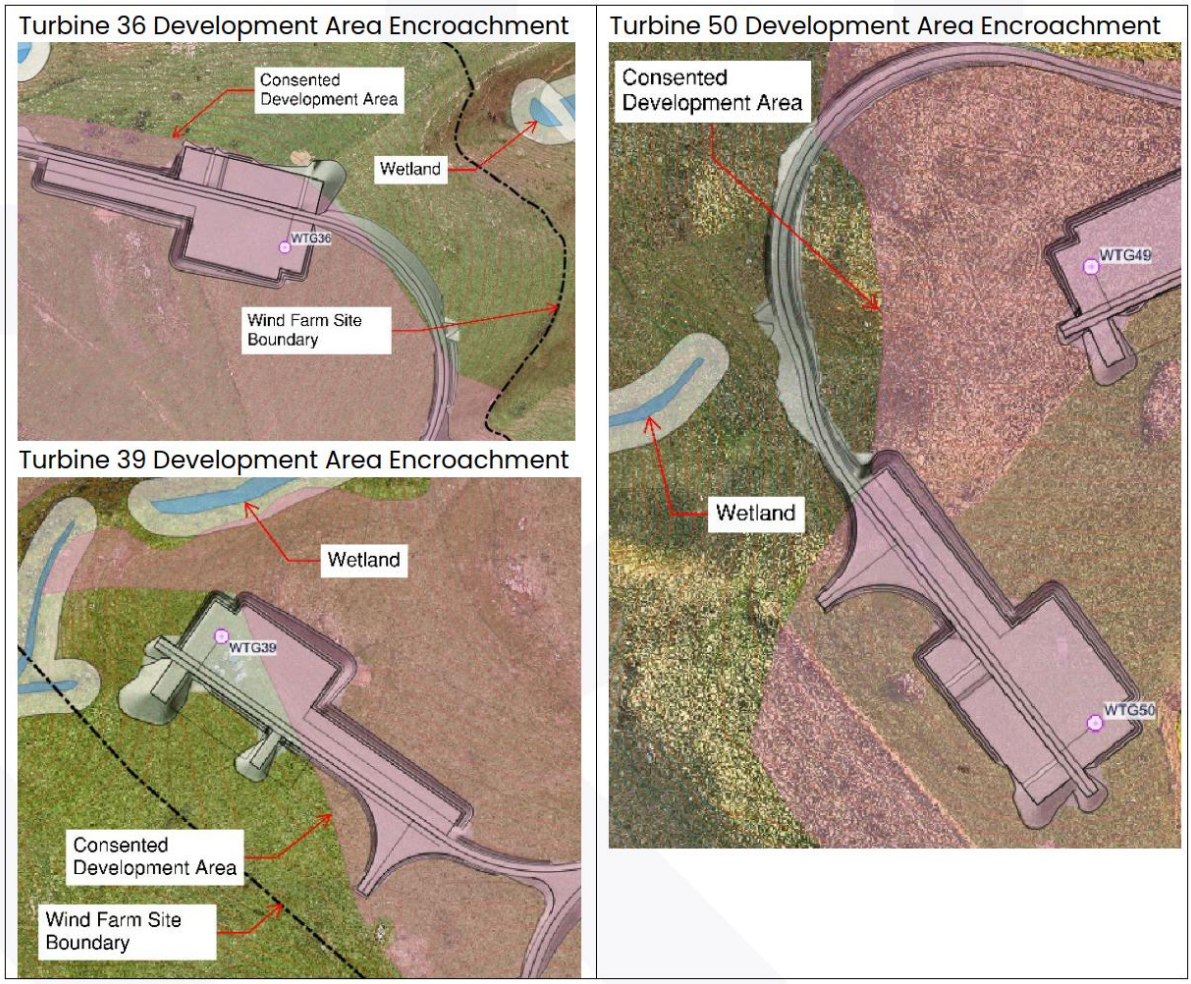

Figure 16. Proposed earthworks outside the consented development area. Figure provided courtesy of Riley Consultants Ltd.

Plate 5. VES site 5 where the WTG 50 access track is proposed.

Plate 6. VES site 2 where the upper margins of the slope is impacted by a portion of the WTG 52 hardstand, access track and batter slopes..

Plate 7. VES site 83 where a portion of the WTG 20 hardstand, access track and batter slopes are proposed.

8.0 Assessment of Effects

The following section details an Ecological Impact Assessment in accordance with 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).

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 (Roper-Lindsay, *et al.* 2018). 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 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 ecological features following the TWP'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.

The EIANZ assessment methodology for this assessment is provided in **Appendix D**.

The effect of the change in layout between the consented layout and the proposed Stage 2 layout has been assessed including in regard to movement of CZs, SFD, removal of Windfarm Buffer Areas for Stage 2 and changes to the access tracks. Potential adverse effects of the proposed works on lizard habitats were quantified by SLR Consulting Ltd by overlaying GIS layers of proposed works areas on mapped vegetation types. For the land use variation application, the Stage 2 layout on a worst-case scenario was compared to the realistic consented layout. The worst-case scenario for Stage 2 selected the 44 turbines with the highest potential impacts on ecological values from the 54 potential turbine locations and associated CZs. The assessment also factored in the undertaking of works anywhere within a CZ. For the consented layout, 47 turbine locations of the 88 (remaining) potential turbine locations were selected.

For the 110kV transmission line, BESS, and regional consents, a new activity effects assessment was undertaken. A detailed assessment of these changes is described by SLR (SLR Consulting Ltd 2025) and this report relies on that report in this regard. A comparison between potential effects on lizard habitats between the consented layout and Stage 2 layout is provided in **Table 11**. Omitted from **Table 11** is a comparison of rock areas between the consented layout and Stage 2 layout. This habitat type is of low habitat value and makes up c. 350 m^2 or <0.01% of the total layout and thus is of no meaningful relevance with regards to actual and potential effects to lizards.

With regards to lizard habitats, the change in design will result in avoidance of c. 3.5 ha of snow tussock grassland and c. 0.2 ha of wetlands and will increase the extent of clearance of rough pasture by 3.2 ha. Overall, there is a reduction in permanent effects to the extent of suitable habitat for native lizards of 0.1 ha.

The overall extent of the loss of lizard habitat associated with the new consent works associated with the Transmission Corridor access tracks, pads and pole sites, BESS, SW Basin, O & M Facility, Site Compound, Batching Plant and Substation is c. 0.1 ha. Therefore, it is concluded that the averted loss of habitat associated with the proposed changes to the Stage 2 layout will directly balance the loss of habitat associated with the new consent works and no further consideration of offsetting/ compensation is required.

Table 11. Comparison between potential effects on vegetation and wetlands between the consented layout and Stage 2 layout. Negative areas (m²) represent an improvement (less clearance) between consented and Stage 2 layouts.

Scenario/ Site	Total area	Snow tussock grassland	Indigenous shrubland	Rough pasture	Wetland	Remaining exotic vegetation
Consented layout CZ (47 of 88 CZ)	890,525	100,721	0	127,710	869	661,225
Stage 2 CZ (worst 44 of 54 CZ)	1,084,833	98,417	0	211,159	0	775,257
Difference	+194,308	-2,304	0	+83,449	-869	+114,032
Consented layout SFD	659,705	58,259	0	85,917	2,392	513,200
Stage 2 SFD	415,779	21,133	0	69,308	0	325,338
Difference	-243,926	-37,126	0	-16,609	-2,392	-187,862
BESS	4,197	0	0	0	0	4,197
SW Basin	228	0	0	0	0	228
O & M Facility	2,191	0	0	208	0	1,983
Site Compound	10,349	0	0	0	0	10,349
Batching Plant	10,661	0	0	0	0	10,661
Substation	6,594	0	0	0	0	6,594
Consented internal roads[2]	454,386	64,262	108	37,583	1,522	350,911
Stage 2 internal roads[3]	260,786	18,967	29	31,786	476	209,528
Difference	-193,600	-45,295	-79	-5,797	-1,046	-141,383
Transmission Corridor - Access Tracks and pads at pole sites [4]	66,703	2	0	1,222	0	64,660

[1] Wetlands included for completeness. [2] All roads. Calculated from the 2009 Civil design shapefile, from which 2009 CZs were removed. [3] All roads. Calculated from the Earthworks Boundary shapefile (incorporating the outer extent of all earthworks except for SFDs), from which hardstands and CZs were removed. Also includes small parts of turbine laydown areas that extend beyond the CZs. [4] Calculations based on 4.5 m wide tracks.

8.1 EIANZ Effects Assessment

Tussock 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 Otago region, and of Low ecological value.

In terms of lizard habitat values affected by the Stage 2 layout and all other new development works, there is:

- 22.3 ha of low value habitat;
- 12.5 ha of moderate value habitat; and
- 1,285 m^2 of high value habitat.

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).

Within the Waipori Ecological District there is c. 70,000 ha of contiguous high-quality habitat for Tussock skink and McCanns skink within the Te Papanui Conservation Park, Black Rock Scientific Reserve and surrounding areas. At a smaller localised scale east of the Lammermoor Range from Lake Mahinerangi to Pukerangi, there are similar ecological conditions to the MWF site across a 10,000 ha area. This takes into consideration altitude, aspect, topography (gully systems), land environment, and vegetation cover of mixed snow tussock, rough pasture and wetlands. It is estimated that there is >1,000 ha of similar habitat over this area (10% cover) (**Figure 17**).

Works within c. 35 ha of lizard habitat (mostly 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 a 1,000 hectares 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"

At the very far end of the conservative scale, the individual site scale, the magnitude of effect is estimated as a <10% reduction of habitat, which is a 'Low' magnitude of effect.

"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".

The loss of habitat is considered to be a 'Low' magnitude of effect, which overall results in a 'Low' level of effect, or what is more commonly termed a 'less than minor' adverse effect with respect to the RMA 1991.

"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."

The loss of habitat does contribute to a cumulative decline of lizard habitats and in order to ensure there is no-net-loss and biodiversity is maintained, ecological redress of habitat enhancement and creation is required at a ratio of at least 1:1.

For this project, there is a net-gain in lizard habitat values and overall population numbers. [redacted] The offset has been undertaken in advance of the effect by over 15 years, which means that lizard populations and values have accrued and there is no "time-lag" or temporal effect.

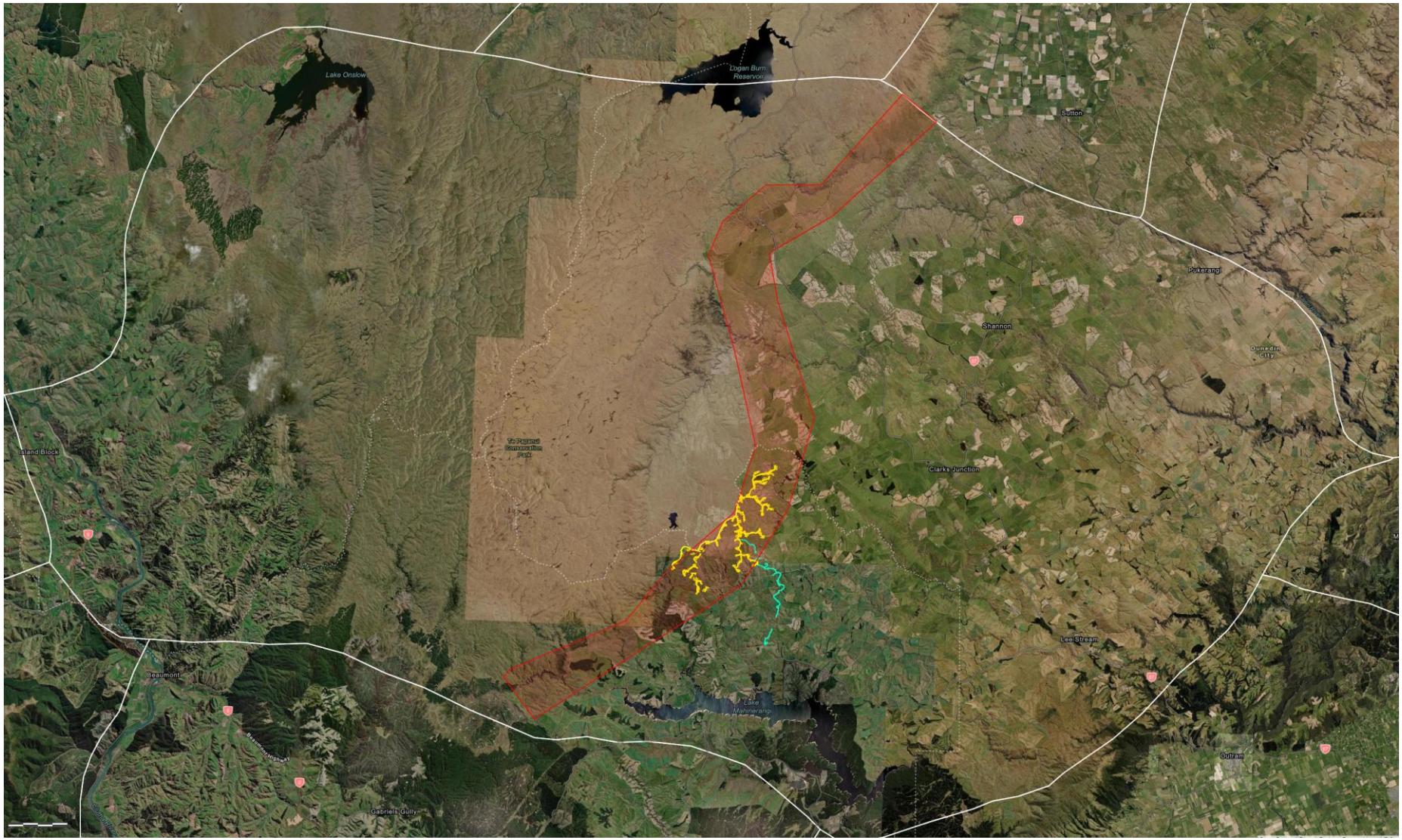

Figure 17. MWF layout (yellow), Transmission access tracks, pads and poles (blue), comparable assessed local scale (red), Ecological District (white).

8.2 Management of Effects

Approximately 75% of the Stage 2 MWF layout and 98% of the Transmission Corridor layout include exotic pasture and/ or cropping areas which provide no habitat for lizards. The layout avoids the best habitats for lizards that have been consented for development, including the Thomas Block and "Scrappy Pines Block" QEII Covenant. TWP has advised that the current Stage 2 MWF layout and Transmission Corridor 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 wind farm.

To minimise adverse effects to lizards during construction, a Lizard Management Plan (LMP) has been prepared following good practice guidance (DOC 2019)[11] (**Appendix B**) and an application of a Wildlife Approval is sought to authorise relevant activities associated with the Application (**Appendix C**). In summary, the LMP includes:

- Deploying a minimum of 600 ACOs within the best habitats for lizards and checking these a minimum of five times (3,000 checks) and relocating lizards to the "Scrappy Pines Block" QEII covenant area;
- Salvaging lizards from rock outcrops;
- Outcrops impacted by works without resident lizards will be removed and reset, right way up, adjacent to the track margin, and where possible, reset in ways to provide some lizard habitat; and
- Installing lizard-proof fencing along the interfaces of development and of suitable lizard habitat, where relevant.

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 wind farm will be Negligible.

To result in a no-net-loss in values for lizards, and in this instance a net-gain, the loss of c. 22.3 ha of low quality, c. 12.5 ha of moderate quality, and 1,285 m^2 of high-quality habitat, [redacted] QEII Open Space Covenant. Over the past 15 years, management within this area has included the clearance of hectares of wilding pines, and retirement of grazed pasture which has subsequently developed into indigenous vegetation dominated by dense snow tussock grassland and golden spaniard (**Figure 18**). Overall, this provides excellent habitat for lizards and offsets the effects of the loss of habitat at a 1.6:1 ratio (inclusive of Stage 1 effects[12]) such that there is a long-term positive effect with regards to lizard habitat values.

An additional benefit of the regeneration of indigenous vegetation and all the woody debris is that this has created many hectares of additional high-quality lizard habitat, which means that there are sufficient resources for relocated lizards and consequently the carrying capacity[13] of the site is expected to be very high and much greater than the existing population levels. . In addition to the increase in suitable habitat, ongoing predator control has been undertaken in this area by TWP over the past 15 years, and it has been

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

[12] Approximately 2.5 ha of low to moderate quality lizard habitat (e.g., rough pasture) was impacted as part of Stage 1, based on historic aerial photographs.

[13] Carrying capacity of a site is determined based on the size site, the estimated size of the resident lizard population, and expected lizard population response to management.

demonstrated that a significant increase in lizard numbers can be achieved in areas subject to intensive mammalian predator control (Reardon et al., 2012; Norbury et al., 2022). [redacted] (**Figure 19**). This area will be protected for the life of the wind farm, and over time the c. 2.3 ha of terrestrial riparian margins will provide further high-quality habitat for lizards. This area will also be used a contingency release site for lizards once vegetation has established.

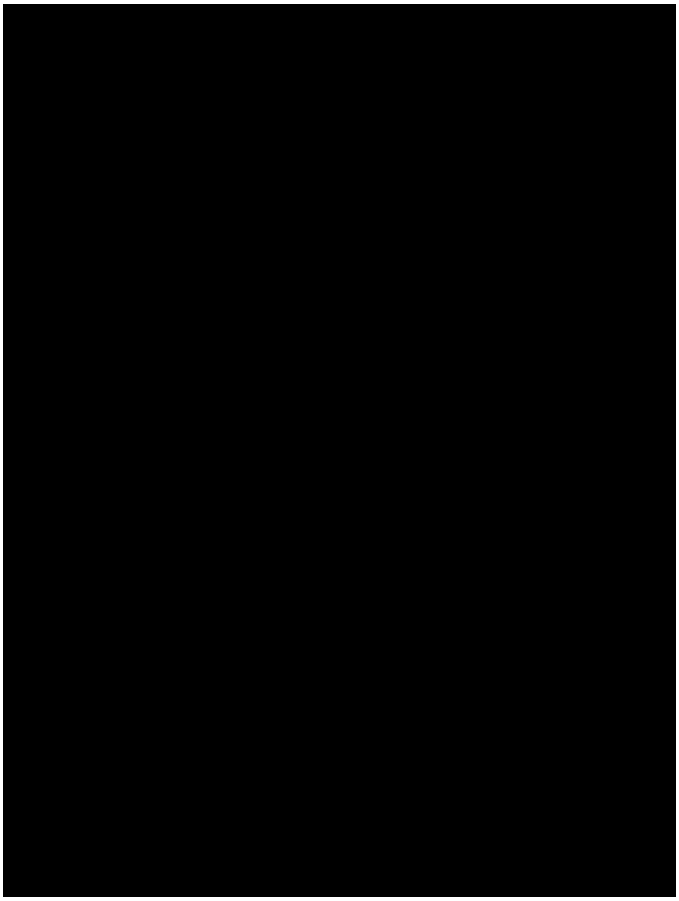

Figure 18. The 59.2 ha "Scrappy Pines Block" (red) in 2013 showing the extent of felled wilding pines.

Figure 19. The wetland compensation site (red line) and terrestrial margins (yellow).

Plate 8. [redacted] (Golder Associates 2010).

Plate 9. [redacted]

9.0 Conclusion

The proposed changes to the Stage 2 layout will result in an adverted loss of 0.1 ha of lizard habitat values that directly balance the adverse effects 0.1 ha of lizard habitat values associated with the new consent activities which include the Transmission Corridor access tracks, pads and pole sites, BESS, SW Basin, O & M Facility, Site Compound, Batching Plant and Substation.

Following the implementation of the Lizard Management Plan, the actual and potential adverse effects of Stage 2 of the Mahinerangi Wind Farm (including the transmission line and BESS) on lizards will be positive through an increase in extent and quality of lizard habitats that will be protected in.

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Report prepared by:

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Tony Payne

Principal Ecologist

Blueprint Ecology Ltd

Appendix A: Credentials

The design of the lizard survey and descriptions of lizard values were provided by Dr Mandy Tocher. All lizard handling was carried out under the Wildlife Act authority 62386-FAU issued to Dr Tocher for private land. We are grateful and thank Dr Tocher for her significant contribution to this assessment.

Mr Payne has over 10-years direct experience surveying native lizards from Northland to Otago. Sectors include Wind 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 Windfarm 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.

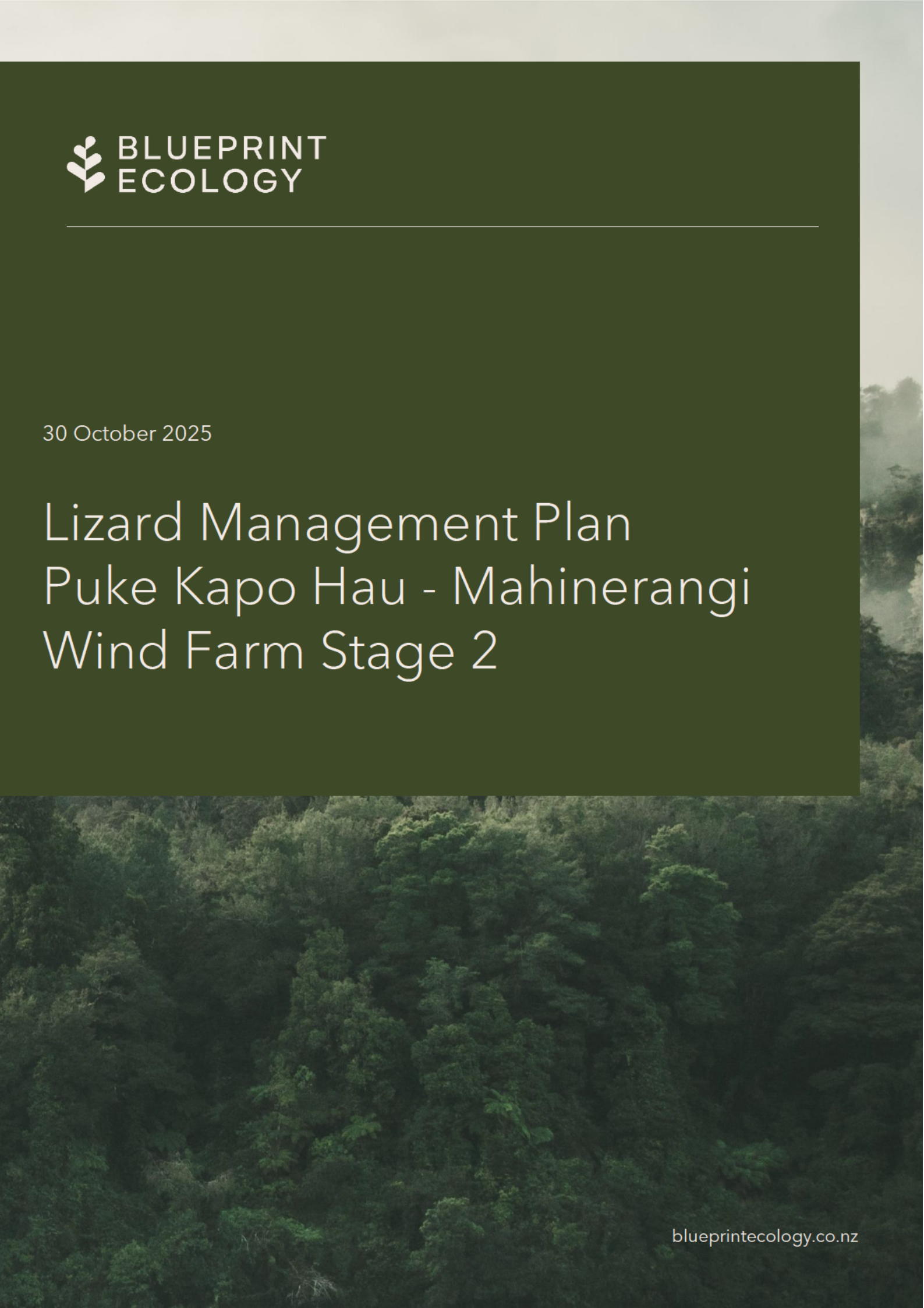
National survey: 118461-FAU.

Appendix B: Lizard Management Plan

BLUEPRINT ECOLOGY

30 October 2025

Lizard Management Plan Puke Kapo Hau - Mahinerangi Wind Farm Stage 2



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Blueprint Ecology Limited

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Version date:	30 October 2025
Version Status:	Final

CITATION:

Blueprint Ecology Limited. 30 October 2025. Lizard Management Plan: Puke Kapo Hau - Mahinerangi Wind Farm Stage 2. Report prepared for SLR Consulting New Zealand Limited. 59 pages + Appendices.

BLUEPRINT ECOLOGY

Contents

1.0 Introduction

1.1 Background

Tararua Wind Power Limited (TWP), a fully owned subsidiary of Mercury NZ Limited, is progressing Puke Kapo Hau - Stage 2 of the Mahinerangi Wind Farm (MWF). The consented site area of the Mahinerangi Wind Farm Site is approximately 1,723 ha and is located on the eastern foothills of the Lammermoor Range at approximately 600m and 730 m elevation, situated approximately 5 km north of Lake Mahinerangi and approximately 50 km west of Dunedin. The west and north-western boundary of the MWF is bounded by the Te Papanui Conservation Park and Black Rock Scientific Reserve. The MWF is situated within a predominately pastoral setting that has a backdrop of lesser developed land at the Lammermoor Range.

Blueprint Ecology Ltd were engaged by SLR Consulting New Zealand Limited to provide specialist ecological advice with respect to the management of lizards to avoid, minimise or remedy and if possible and appropriate, offset or compensate more than minor residual impacts. A Lizard Assessment (Blueprint Ecology Ltd 2025) of actual and potential impacts to lizards associated with the development was prepared which includes detailed descriptions of lizard values and habitat types present within the Windfarm Development Area and the proposed development footprint, and measures taken to avoid, minimise, or remedy potential adverse impacts. That report should be read in conjunction with this Lizard Management Plan (LMP).

To inform the Lizard Assessment, a survey of lizard populations across all potential habitat types within and surrounding the Stage 2 Windfarm Development Area was undertaken in March and April 2025. The survey confirmed McCann's skink (*Oligosoma maccanni*) and tussock skink (*Oligosoma chionochloescens*) within snow tussock grassland, rough pasture, wetlands, plantation forest and rock habitats within the Stage 2 Windfarm Development Area and indicative windfarm layout.

All native lizards are protected under the Wildlife Act 1953. The Fast-track Approvals Act 2024 (FTAA) provides for Wildlife Approvals which are an authority for an act or omission that would otherwise be an offence against specified provisions of the Wildlife Act 1953 including where native lizards may be harmed or killed during the course of a site's development.

A Wildlife Approval may grant permission to relocate native lizards, and the killing or injury of lizards not caught or relocated from a site.

The purpose of this LMP is to describe the methodological approach to the salvage of lizard across habitats of moderate and high value within the MWF Stage 2 prior to earthworks and vegetation clearance, the relocation of these lizards to a suitable site, and the management of this release and relocation site thereafter.

The objective of this management plan is to avoid, minimise, remedy or compensate adverse effects of construction works on any native lizard species in the Puke Kapo Hau - Mahinerangi Wind Farm Stage 2 Wind Farm Development Area and Transmission Line Corridor.

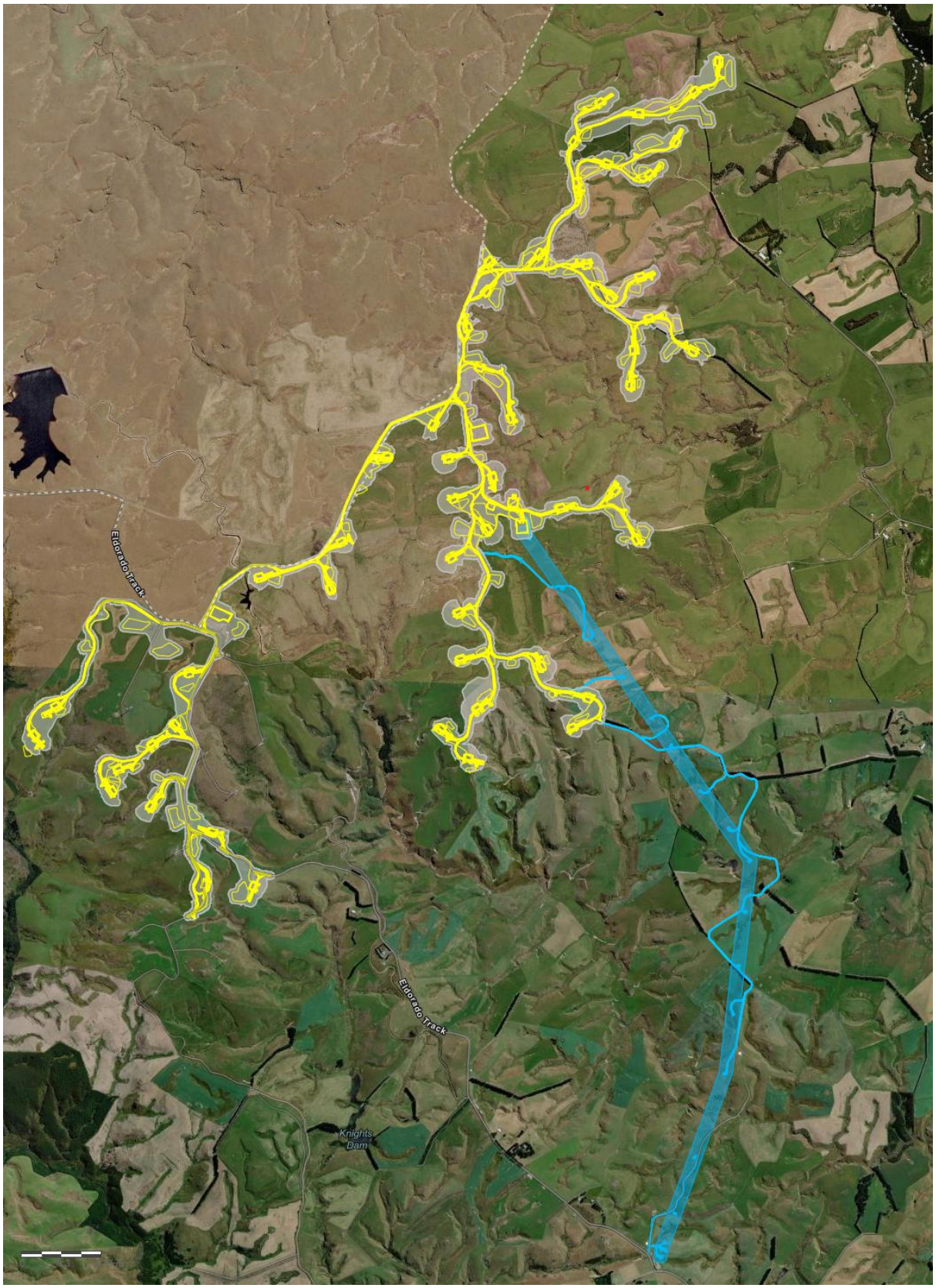

Figure 1. Mahinerangi Stage 2 layout (yellow), Windfarm Development Area (grey), Transmission Line Corridor and access tracks (blue).

1.2 Key Principles for Lizard Salvage and Transfer in New Zealand

The Department of Conservation has prepared a "best practice" guidance document (DOC 2019) which describes nine principles that should be adhered to when applying for a Wildlife Act Authority for a lizard salvage and transfer resulting from a proposed development project (DOC's principles). It covers the practice of lizard salvage and transfer and addresses the entire process including:

1. Assessments of the impacts of proposed developments on lizards and exploration of alternatives (e.g. avoidance of lizard habitat).
2. Planning of salvage operations and assessment and approval of these proposals from the appropriate authorities.
3. Preparing habitat at release sites, capturing lizards at impact sites, temporary captivity (if required), data collection, transport to and release at receiving sites.
4. Post-release monitoring, contingency implementation as appropriate, and reporting to DOC (and/or other consent authorities).

A summary of the nine principles and how they have been addressed in this LMP is provided in **Table 1**.

Table 1. Assessment of DOC's Nine Principles for Lizard Salvage.

Principle for Lizard Salvage	Summary of Assessment of Principle
1. Lizard species' values and site significance must be assessed at both the impact (development) and receiving sites.	Lizard species' values, and site significance has been assessed based on a desktop assessment of the herpetofauna database, a site survey of available habitats via manual habitat searching and visual encounter surveys, and survey devices (Artificial Cover Object (ACO), Gee's minnow traps). The significance of the habitat at the impact and receiving site for lizards has been assessed based on the size, quality, species diversity and abundance.
2. Actual and potential development-related effects and their significance must be assessed.	The actual and potential development related effects and their significance have been assessed based on 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). For lizard species and habitat, the overall ecological effect after managing effects has been applied is positive (a net increase in lizards and net increase in the size and quality of habitat of 24.2 ha).
3. Alternatives to moving lizards must be considered.	Stage 2 has reduced the consented number of turbines to 44 and avoided the principal high value lizard habitat within the consented layout being the Thomas Block and the QEII block. It is understood that the proposed layout encompasses all areas and values for lizards that can be avoided to the extent practicable. Avoidance and remediation measures cannot result in no-net-loss of lizards from the development area. Compensation is proposed to achieve a net-gain in lizard values. There are no alternatives to moving lizards.
4. Threatened lizard species require more careful consideration than less-threatened species.	No lizard species listed as Threatened (Hitchmough et al. 2021) are likely to inhabit the development footprint. No Threatened lizard species are applicable to this LMP.
5. Lizard salvage, transfer and release	The lizard salvage includes the best available methodologies.

Principle for Lizard Salvage	Summary of Assessment of Principle
must use the best available methodology.	This includes an extensive grid of ACO covers at 5-10 m spacings within suitable habitats for lizards, with a total of 600 devices. The effort allocated to lizard salvage will include a minimum of five checks. The transfer of lizards will be undertaken in the most appropriate way to minimise stress on lizards (see section 8.5). Captured lizards will be relocated the same day as capture to a pre-identified release site and released directly into areas that provide immediate protection from predators (e.g., woody debris).
6. Receiving sites and their carrying capacities must be suitable in the long term.	The receiving site is 1.6 times larger than the impact area with higher quality habitat for the relevant species. The release site includes hectares of woody debris from clearing wilding pines, and many hectares of snow-tussock grassland that has reverted from grazed pasture. These conditions will allow for population growth and secondary spread and provide suitable habitat resources to cater for the carrying capacity in the long-term for all species of lizard proposed to be salvaged.
7. Monitoring is required to evaluate the salvage operation.	Post-release monitoring will be undertaken annually for 3 years following lizard salvage.
8. Reporting is required to communicate outcomes of salvage operations and facilitate process improvements.	Reporting of the outcomes of the lizard salvage and post-release monitoring results will be provided to DOC for 3 years.
9. Contingency actions are required when lizard salvage and transfer activities fail.	A further 2.3 ha of lizard habitat will be created and protected as part of compensating effects to natural wetlands. This provides a contingency for habitat creation, where a separate area for lizards will be established in the instance that there are unforeseen effects/ disturbance at the release site (e.g., fire). The lizard salvage and transfer follow a standard methodology and no contingency actions are proposed nor appropriate / required for this activity. For species unlikely to occur on site, the release site includes all the necessary habitat requirements.

2.0 Ecological Context

The site is located on the border between the "wet south east" environmental zone and the "dry grassland" vegetation zone of Waipori Ecological District in Lammerlaw Ecological Region, with approximately 800-1,000 mm of annual rainfall (Carter 1994). Prior to the arrival of Europeans, the dominant vegetation type in the ecological district would have been low- to mid-altitude short and tall tussock grassland (with narrow-leaved snow tussock (*Chionochloa rigida*), copper tussock (*Chionochloa rubra* subsp. *cuprea*), and hard tussock (*Festuca novae-zelandiae*)), which has now been mostly converted to pasture up to about 600 m asl (McEwen 1987). The geology in the area is dominated by schist-block mountains and fault-controlled basins which have eroded to form the Otago peneplain surface (Bishop 1994, ORC 2013). The majority of the site lies within the headwaters of the Lee Stream catchment at about 675-700 m asl. West of the main access road along the paper road portion of Eldorado Track, gullies are part of the Deep Stream catchment. Gullies are generally shallow and broad in the upper reaches, becoming further incised downstream.

Most of the Wind Farm Site, in the process of conversion to farmland, has been burnt and grazed, and some parts cultivated, but prior to 1840 would have been similar to the adjacent Black Rock Scientific Reserve which lies outside the Wind Farm Site to the west of Turbine 12 (constructed during Stage 1) and immediately adjacent to the proposed access road to Stage 2 of the MWF (**Figure 2**). The reserve consists of "gently rolling ridges covered in a narrow-leaved snow tussock association, substantially intact or in various stages of degradation, and shallow gullies containing Sphagnum bog and minor grassland communities" (Bulloch 1973).

Te Papanui Conservation Park, which is dominated by snow tussock grassland and contains bogs and tarns, is located c.4 km to the west of the Wind Farm Site. Following completion of the Stage 1 of the wind farm, a 59.2 ha QEII Open Space Covenant was created in accordance with the consent conditions for the MWF over an area formerly referred to as the "Scrappy Pines Block"[1]. Condition 14 required the covenanting of the Scrappy Pines Block "no later than six months after the construction of the turbines and the rehabilitation of tracks". Not all of the consented turbines within the Scrappy Pines Block were constructed as part of Stage 1, however TWP is not proposing any further works within the Block as part of Stage 2. The QEII covenanted area predominantly contains snow tussock grassland and is located in the southern part of the wind farm (**Figure 2**).

A Marginal Strip is also located alongside the Lammerlaw Creek to the southwest of the Wind Farm Site (**Figure 2**). No works for Stage 2 are proposed within the marginal strip. Recommended Area for Protection (RAP) 9 Black Rock from the Protected Natural Areas Programme (PNAP) report for Waipori Ecological District (Carter 1994) is located west of proposed turbine sites 39 and 40 outside of the Wind Farm Development Area (see **Figure 2**). The RAP was described as containing representative silver beech (*Lophozonia menziesii*) forest that is much reduced in extent in the ecological district and shrubland of Coprosma dumosa, tauhinu (*Ozothamnus vauvilliersii*), *Veronica odora*, and bracken (*Pteridium esculentum*). No works for Stage 2 are proposed within the RAP.

[1] See Condition 14, Land use consent RM1409

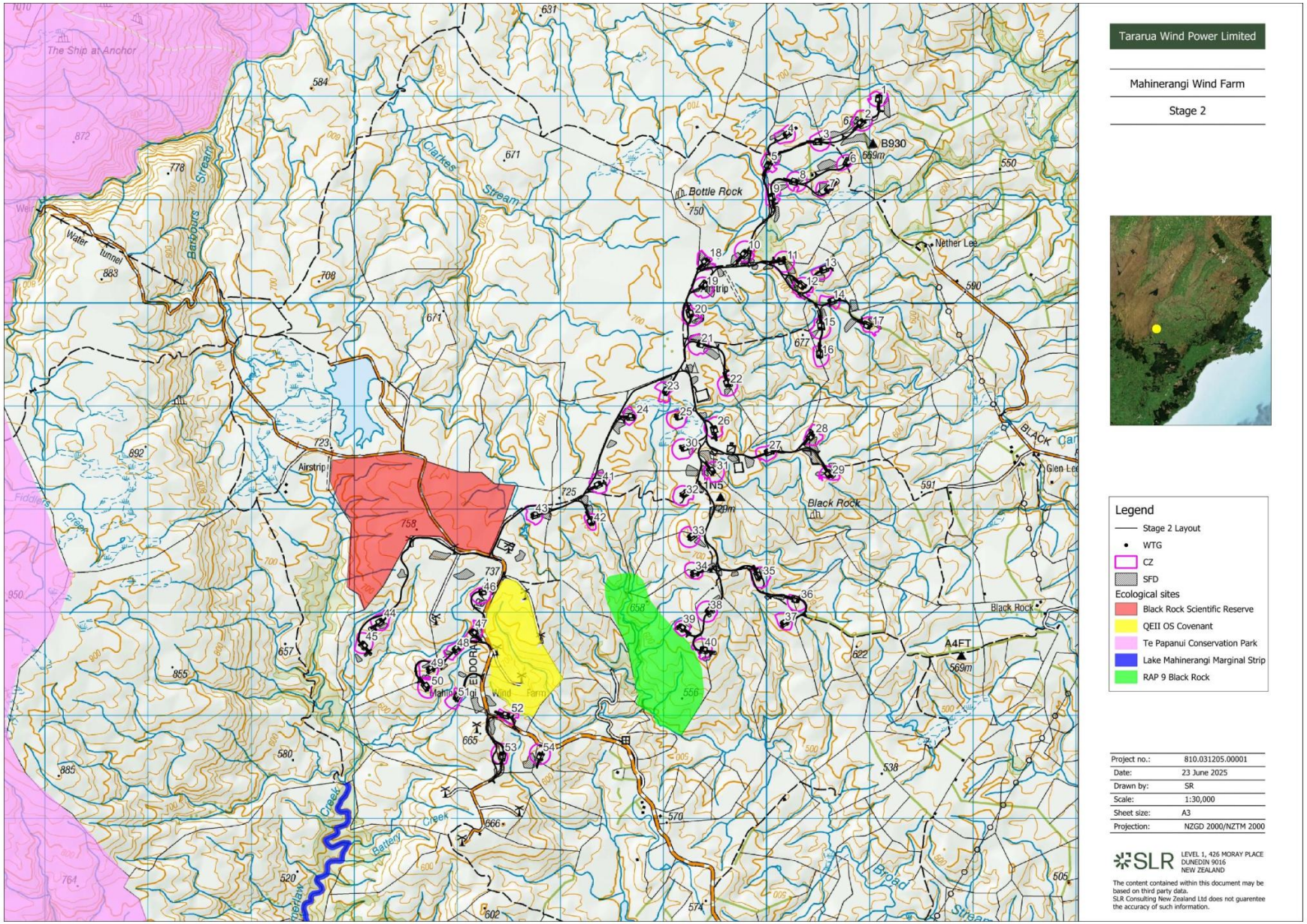

Figure 2. Ecological sites near the MWF Stage 2. Figure provided courtesy of SLR.

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, and these were refined by excluding records older than 20 years as these will likely not be representative of the current species composition (**Figure 3**). Information sources also included:

- A review of the ecology report that informed the MWF consents.[2]
- Google Earth imagery (dated 10/11/24) to assess habitats present along with SLR terrestrial vegetation mapping (SLR Consulting Ltd 2025).
- DOC survey reports.
- PNAP report for Waipori.

The desktop lizard assessment determined that the rolling hill country over which the MWF site was known to once support up to eight lizard species, of which only seven are extant (**Table 2**). A detailed description of each species is provided in the following sections.

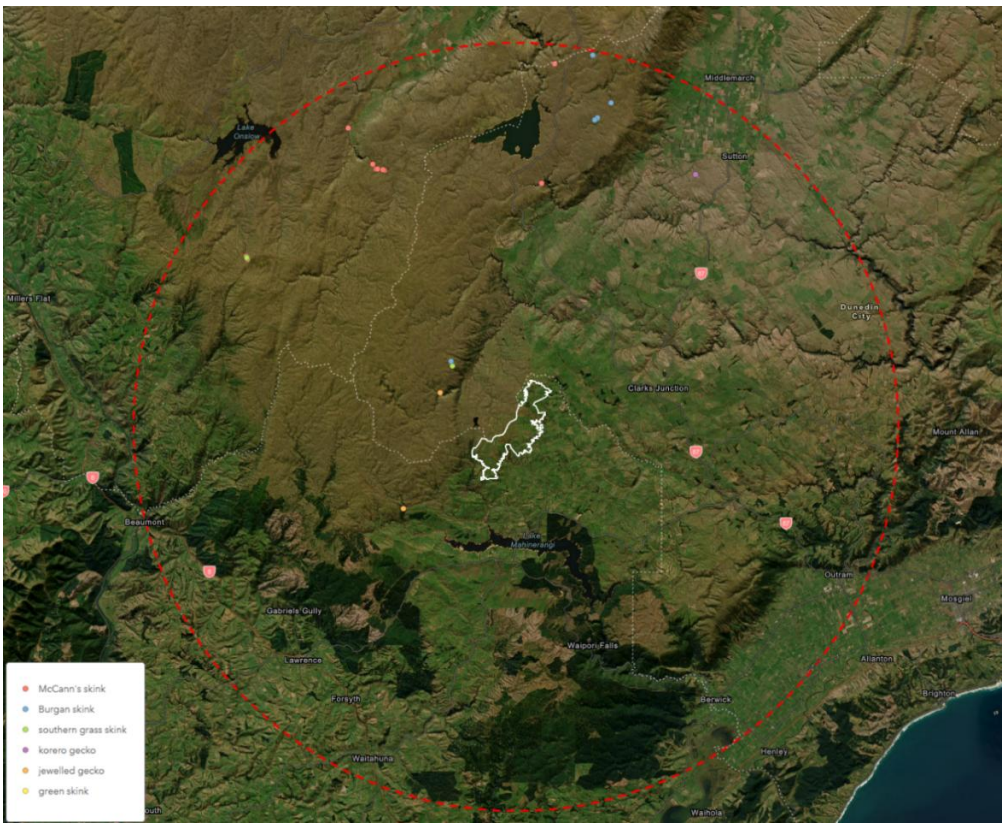

Figure 3. MWF site (white), lizard records (colour points), 30 km buffer (red line)

[2] Kingett Mitchell Ltd November 2006 report. Mahinerangi windfarm ecological assessment.

McCann's Skink

McCann's skinks are common throughout rural Otago and tend to persist in a variety of degraded habitats longer than other lizard species. Records for McCann's skink are present in the DOC Herpetofauna database within 20 km of the MWF site, including at the altitudes of the MWF site. McCann's skinks were found over the consented layout in 2006 (Kingett Mitchell Ltd 2006)[3] and was described as "common and tended to be associated exclusively with rocky tors and outcrops".

Tussock skink

Tussock skinks referred to in earlier reports as 'southern grass skink'[4]) occupy a relatively narrow range of habitats compared to McCann's, occurring in tussock lands, rough pastures, open shrublands and wetlands. In 2006 tussock skinks were noted as occurring in "open tussock grassland areas and around rocky outcrops" (Kingett Mitchell Ltd 2006). There are several records of tussock skink in the DOC Herpetofauna database within 5 km of the MWF site.

Kōrero gecko

Kōrero gecko have experienced declines in Otago over the last 30-years; a once common gecko species is now becoming harder to find (M. Tocher pers. obs). Kōrero geckos were detected in the 2006 ecological assessment that informed Stage 1 of the MWF (Kingett Mitchell Ltd 2006) where they were described as "relatively common on rocky tors and outcrops." In terms of habitats, Kingett Mitchell Ltd 2006 state that "geckos were not observed within tussock or pastoral grassland areas" but do not specifically exclude them from rocky tors and outcrops in these habitats. The 2006 survey did not provide georeferenced locations of kōrero gecko, or indeed any lizard species, meaning the 'commonness' of kōrero geckos cannot be fully ascertained over the MWF site. The schist over the MWF site is "undifferentiated Caples Terrane TZIII schist"[5] which is known for its quartz veins and minimal foliation making it blocky and substandard as lizard habitat compared to other schist in Otago (e.g., around Alexandra). For this report, therefore, the likelihood of kōrero geckos being present over the MWF site has been assessed as "Low" given the lack of records nearby and the quality of rock habitats present.

Jewelled gecko

Jewelled geckos, an arboreal (tree-dwelling) gecko, are thought to be once relatively common in the vicinity of Lake Mahinerangi (Whitaker et al. 2002) and were found at Black Rock within 3 km of the site. They are also known from Lammerlaw Stream catchment (Carter 1994) and Nardoo Scenic Reserve immediately to the west of the Stage 2 project area (Ward and Munro 1989).

No jewelled geckos were found over the MWF site during the 2006 survey that included a night search of shrubby areas north of Black Rock Scientific Reserve (Kingett Mitchell Ltd 2006). Based on habitats present and the degree of modification/removal of shrublands over the MWF site, the likelihood of jewelled geckos being present over the MWF site has been assessed as "Low".

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[3] It is not known with certainty that tussock skinks were found during the 2006 survey as Figure 3.14 describes a McCann's skink as a common skink (equivalent to a southern grass skink in 2006).

[4] *Oligosoma* aff. *polychroma* clade 5 which was classified as "At Risk – Declining" by DOC in 2021 (Hitchmough *et al.* 2021).

[5] https://data.gns.cri.nz/geology/

Burgan skink

Burgan skinks have only recently been described (Chapple *et al*. 2011) and are currently considered an alpine specialist. Recent survey work has expanded their known distribution over the Otago uplands, but all records occur in areas of dense vegetation at altitudes above 700 m asl. (Wildlands 2019, 2020, 2021 and 2022; M. Tocher pers. obs.). The likelihood of Burgan skinks being present over the MWF site, that takes in altitudes not known to support Burgan skinks, has been assessed as "Very low".

Herbfield skink

Herbfield skinks (Jewell 2022) were once known as cryptic skinks over large swathes of Otago including areas adjacent to the MWF site (e.g., near the Waipori dam; Tony Jewell pers. comm., May 2025). It is possible that records of both tussock skink and McCann's skink have been confused for herbfield skink by inexperienced observers as they can look very similar. Herbfield skinks usually inhabit damp, densely vegetated microsites in grassland, indigenous herb fields and open shrublands. The presence of herbfield skinks over the MWF site has not been confirmed, despite reference to cryptic skinks being recorded "locally around the MWF site" in the 2006 ecological assessment that informed Stage 1 of the MWF (Kingett Mitchell Ltd 2006). Notably, surveys by a team of experienced herpetologists failed to detect herbfield skinks over the MWF site in 1987 (Whitaker 1987) which is consistent with a description of the distribution of the species as "patchy and localised" (Whitaker 2002). Based on habitats present, herbfield skinks have been assessed as having a 'Very low' likelihood of being present over the MWF site.

Otago green skink

Otago green skinks are large-bodied skinks that require dense vegetation and rock to survive in a predator-loaded environment such as MWF site (Tocher 2006). No records for Otago green skink were found in the DOC herpetofauna database for the MWF site or nearby areas, and Otago green skinks were not detected over the 2006 lizard survey that informed Stage 1 of the MWF (Kingett Mitchell Ltd 2006) or in a 2021 survey to inform the Lake Onslow Battery Project (Konlechner et al. 2022), noting this survey concentrated effort about 700 m asl. Well outside the MWF site, a green skink was found in 2009 along the Teviot River South Branch (c. 25 km west from the centre of the MWF site; Konlechner et al. 2022). A 1987 lizard survey of the area also failed to detect green skinks south of Sutton Stream despite suitable habitat occurring elsewhere (Whitaker 1987). For this report therefore, and based on habitats present, Otago green skinks have been assessed as having a 'Very low' likelihood of being present over the MWF site.

Grand skink

The 2006 lizard survey to inform Stage 1 MWF found a mummified grand skink c. 4 km north of the Stage 2 MWF layout (Kingett Mitchell Ltd 2006). Grand skinks are known from multiple rocky sites north of the Stage 2 MWF layout but are considered locally extinct (Whitaker 1987; latest recovery plan). Indeed, mummified remains of grand skinks have been found at Macraes Flat over areas where skinks have not been seen for many decades (M. Tocher pers. obs). Moreover, the low foliation characteristics of the schist over the MWF site is not conducive to the long-term persistence of grand skinks. In our opinion, grand skinks are locally extinct and there is no likelihood of being present over the MWF site.

Table 2. Characteristics of the native lizard species recorded in the DOC national herpetofauna database from the Ecological District.

Common Name (Scientific Name)	National Threat Classification (Hitchmough et al., 2021)	Regional threat classification (Jarvie et al., 2024)	Applicable habitats within the Stage 2 project area	Likelihood of occurrence in MWF Stage 2
McCann's skink (*Oligosoma maccanni*)	Not Threatened	Not Threatened	Exotic grassland and crops (cultivated); sparse snow tussock grassland; dense snow tussock grassland; indigenous shrubland (degraded), shelterbelts, wetlands, rock habitat over all habitats	Confirmed
Tussock skink (*Oligosoma chionochloescens*)[6]	At Risk - Declining*	Regionally Declining	Exotic grassland and crops (cultivated); sparse snow tussock grassland; dense snow tussock grassland; indigenous shrubland (degraded), wetlands, rock habitat over all habitats	Confirmed
Kōrero gecko (*Woodworthia* "Otago/Southland large")	At Risk - Declining	Regionally Declining	Rock habitat in sparse snow tussock grassland, dense snow tussock grassland and indigenous shrubland (degraded)	Low
Jewelled gecko (*Naultinus gemmeus*)	At Risk - Declining	Regionally Declining	Any woody vegetation in dense snow tussock grassland; indigenous shrubland (degraded), wetlands	Low
Burgan skink (*Oligosoma burganae*)	Threatened – Nationally Endangered	Regionally Vulnerable	no suitable habitats identified over the MWF site	Very low
Herbfield skink	At Risk - Declining	Regionally Declining	dense snow tussock grassland, wetland	Very low

[6] Tussock skink was described after the NZTCS assessment for reptiles (Hitchmough et al. 2021). We have assumed in this report that it will share same national and regional threat ranking as southern grass skink, *Oligosoma* aff. *polychroma* clade 5.

Common Name (Scientific Name)	National Threat Classification (Hitchmough et al., 2021)	Regional threat classification (Jarvie et al., 2024)	Applicable habitats within the Stage 2 project area	Likelihood of occurrence in MWF Stage 2
(*Oligosoma murihiku*)				
Otago green skink (*Oligosoma aff. chloronoton* "eastern Otago")	Threatened – Nationally Critical[7]	Regionally Declining	Rock habitat within dense snow tussock grassland, indigenous shrubland (degraded) and wetlands	Very low
Grand skink (*Oligosoma grande*)	Threatened – Nationally Endangered	Regionally Endangered	No suitable habitats identified over the MWF site	Nil (locally extinct)

[7] Assessed as *Oligosoma chloronoton*. Work is underway on formalising a four-way split within the *Oligosoma chloronoton* species.

4.0 Lizard Habitats

The site is characterised by a network of waterways/gullies separated by low ridges. The flat ridgetops largely contain grazed exotic grassland and brassica crops. Modified remnants of snow tussock grassland remain at some ridgetop sites, and on gully walls which are more difficult to develop for farming activities. Wetlands are present in gully floors, on gully walls, and in flatter areas where drainage is poor. Indigenous shrublands are present at a few sites on gully walls and floors. A small area of recently replanted plantation forest is present. Rock outcrops are generally small and uncommon.

The extent of vegetation communities as they relate to each of the specific development sites are provided in **Table 3**. Vegetation communities are interpreted to lizard habitat quality, as summarised in **Table 4**.

Table 3

Vegetation and Habitat Type	CZ (54 locations)	SFD	BESS	O&M Facility	Substation	Batching plant	Site compound	Internal Roads
Snow tussock grassland	9.80	2.10	0	0	0	0	0	1.9
Indigenous shrubland	0	0	0	0	0	0	0	<0.1
Wetland	0	0	0	0	0	0	0	<0.1
Rough pasture	20.22	6.25		0.2	0	0	0	3.15
Rock	<0.1	<0.1	0	0	0	0	0	<0.1
Remaining exotic vegetation	78.47	33.22	0.42	0.20	0.66	1.07	1.03	21.9
Total	108.48	41.58	0.42	0.22	0.66	1.07	1.03	25.05

Table 4. Vegetation communities and habitats relating to lizard habitat quality.

Vegetation community and habitats	Description	Lizard habitat quality	Comment
Indigenous shrubland	Dominant species are *Olearia bullata* and *Coprosma propinqua*, with scattered shrub pōhuehue (*Muehlenbeckia complexa*) and *Coprosma dumosa*. The groundcover in gully floor shrublands includes rautahi (*Carex coriacea*), sphagnum moss, rushes (*Juncus* spp.), *Hypolepis millefolium*, and pasture grasses.	Low to High	Provides potential habitat for At Risk jewelled gecko.
Snow tussock grassland	The dominant species is narrow-leaved snow tussock (*Chionochloa rigida*) which on average has a cover greater than 50%. Exotic grasses and herbs are common, including browntop (*Agrostis capillaris*), sweet vernal(*Anthoxanthum odoratum*), Yorkshire fog (*Holcus lanatus*), white clover (*Trifolium repens*), mouse-ear hawkweed (*Pilosella officinarum*), and catsear (*Hypochaeris radicata*). Golden speargrass (*Aciphylla aurea*) is scattered and uncommon.	Low to High	Provides habitat for At Risk species including jewelled gecko and tussock skink. Tussock skinks are almost certain to inhabit all of these areas as well as a high abundance of Not Threatened McCanns Skink.
Rough pasture	Comprises exotic grassland with a few to scattered narrow-leaved snow tussocks and/or golden speargrass	Low to Moderate	Provides habitat for At Risk tussock skink. Tussock skinks are likely to inhabit most of these areas, and Not Threatened McCann's skink are in relatively high abundance.
Natural wetlands	Common species include sphagnum moss, other mosses, star sedge (*Carex echinata*), rautahi, jointed rush (Juncus articulatus), blinks (Montia fontana), Edgar's rush (Juncus edgariae), soft rush (Juncus effusus), and exotic grasses.	Low to High	Provides potential habitat for At Risk tussock skink. Tussock skinks are likely to inhabit fewer of these areas relative to other vegetation communities, and McCann's skink are in relatively low abundance.
Rock	A variety of rock habitat is present, and most areas are heavily disturbed by stock. These also consist of 'man-made' collections of rocks moved into rough piles within cultivated paddock. These piles are heavily disturbed by stock; have no indigenous vegetation cover, and as well, the lichen communities had been removed. Such habitats, although at times large (>5 x 5 m in area),	Low to Moderate	Rocks are generally poorly creviced and provide little cover for any lizards present.
Plantation forest	An area of recently felled radiata pine forest This area has been replanted in Douglas fir (*Pseudotsuga menziesii*) which are still less than 1 m tall, although numerous small radiata pine seedlings have regenerated from seed in the soil. The site is dominated by windrows of decomposing waste wood and browntop-	Low	Provides potential habitat for McCann's skink in relatively low abundance.

Vegetation community and habitats	Description	Lizard habitat quality	Comment
	dominated grassland on open ridgetops, and a few patches of bracken (*Pteridium esculentum*) on gully walls.		
Shelterbelts	Shelterbelts contain various mixes of radiata pine (*Pinus radiata*), another pine species (*Pinus* sp.), Douglas fir, eucalyptus (*Eucalyptus* sp.), Lawson's cypress (*Chamaecyparis lawsoniana*), silver birch (*Betula pendula*), macrocarpa (*Cupressus macrocarpa*), and alder (*Alnus glutinosa*)	Low	Provides potential habitat for McCann's skink in relatively low abundance.
Developed pasture, crops and roads	In the more developed sites, perennial ryegrass (*Lolium perenne*) and white clover are dominant. Open areas within less developed grasslands are dominated by mouse-ear hawkweed (*Pilosella officinarum*), and catsear (*Hypochaeris radicata*), with scattered exotic grasses (particularly browntop and sweet vernal).	Nil	The consistent disturbance and lack of complex cover means that these areas do not provide habitat for native lizards.

Plate 1. Snow tussock grassland (left) within the Te Papanui Conservation Park, and developed pasture (right) within the MWF Stage 2 layout.

Plate 2. Typical rough pasture with minor cover of tussocks and scattered golden Spaniard.

Plate 3. A typical area of rock within a paddock. These areas are often man-made cairns.

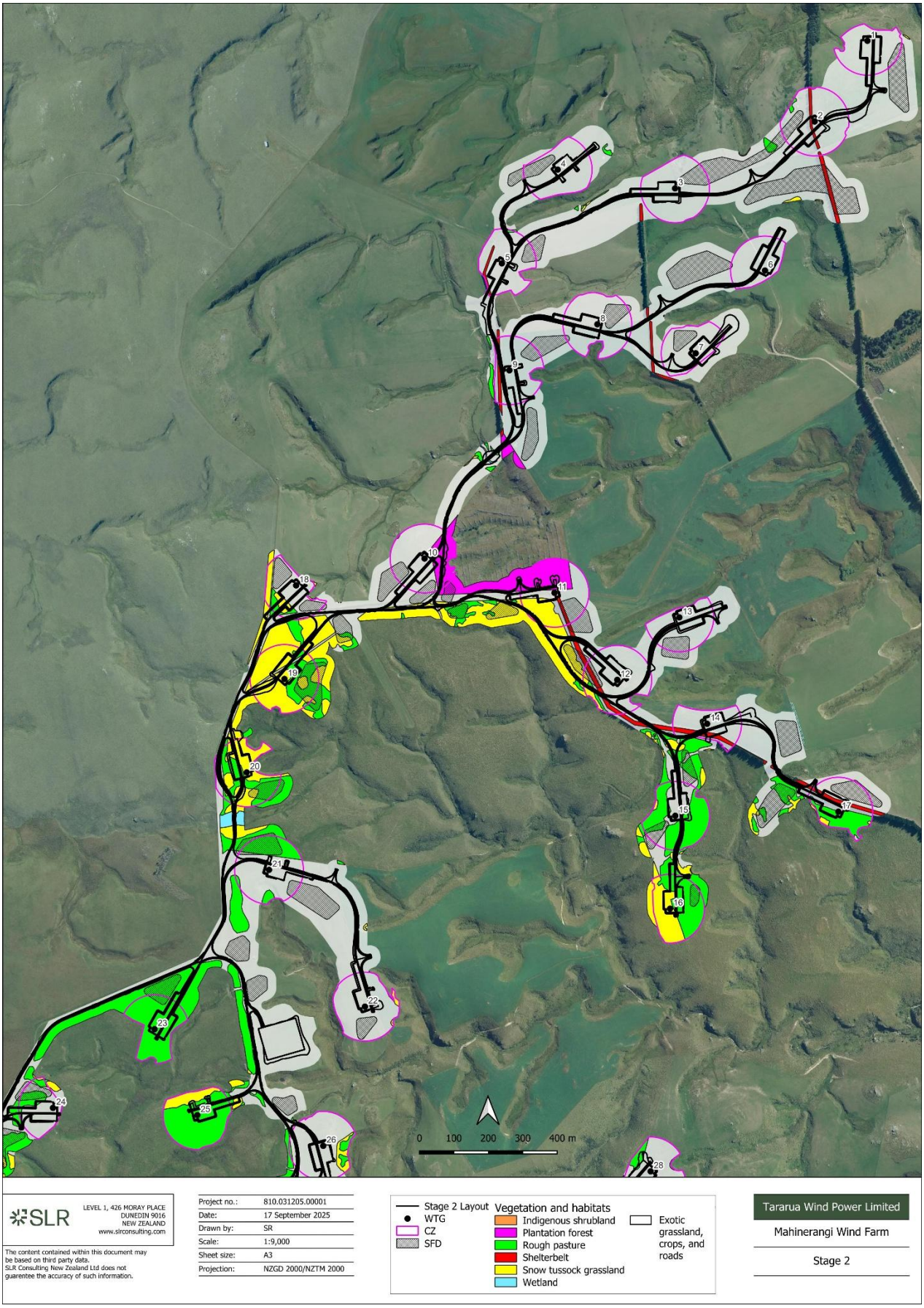

Figure 4. Vegetation and habitats. Figure provided courtesy of SLR.

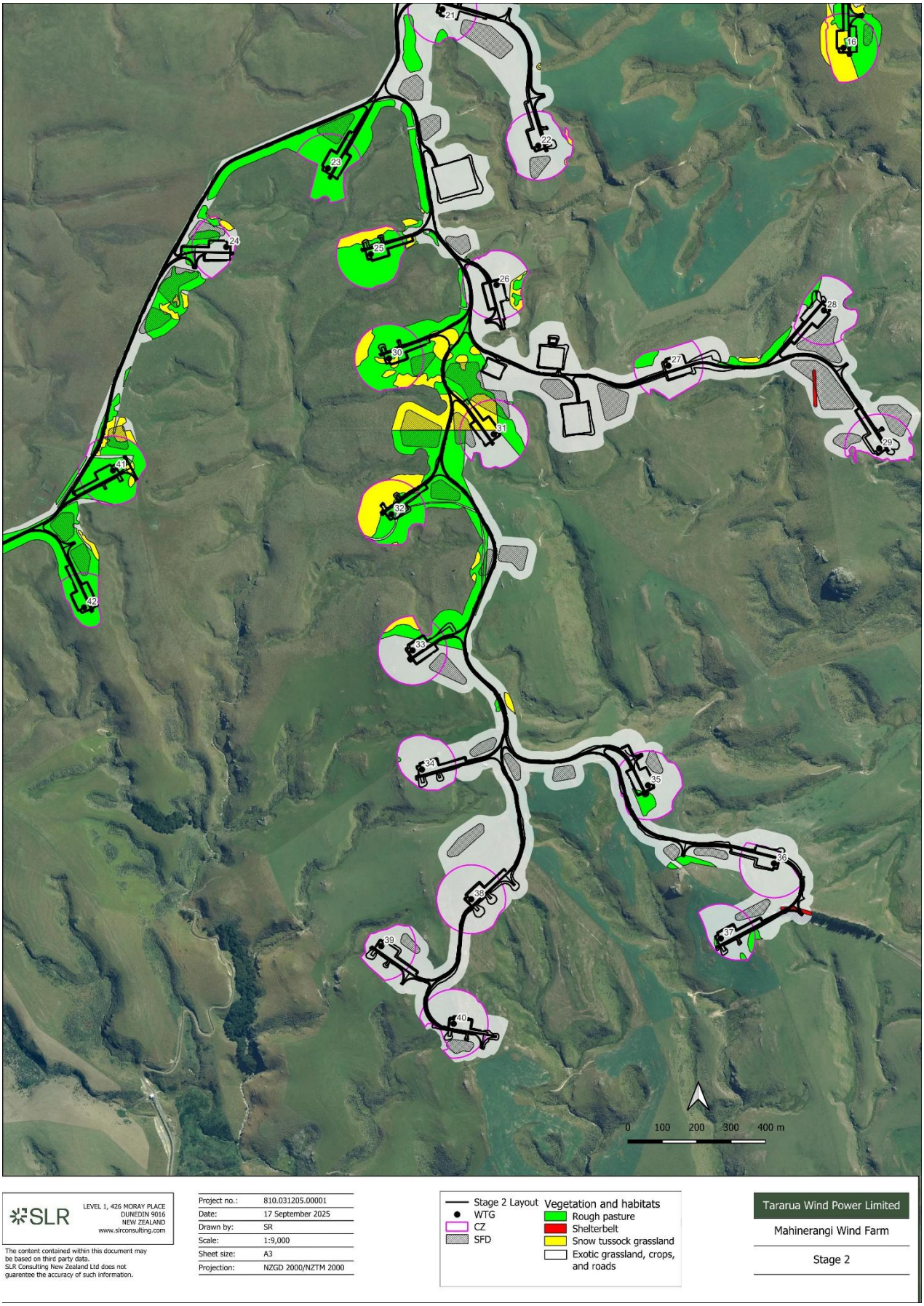

Figure 5. Vegetation and habitats. Figure provided courtesy of SLR.

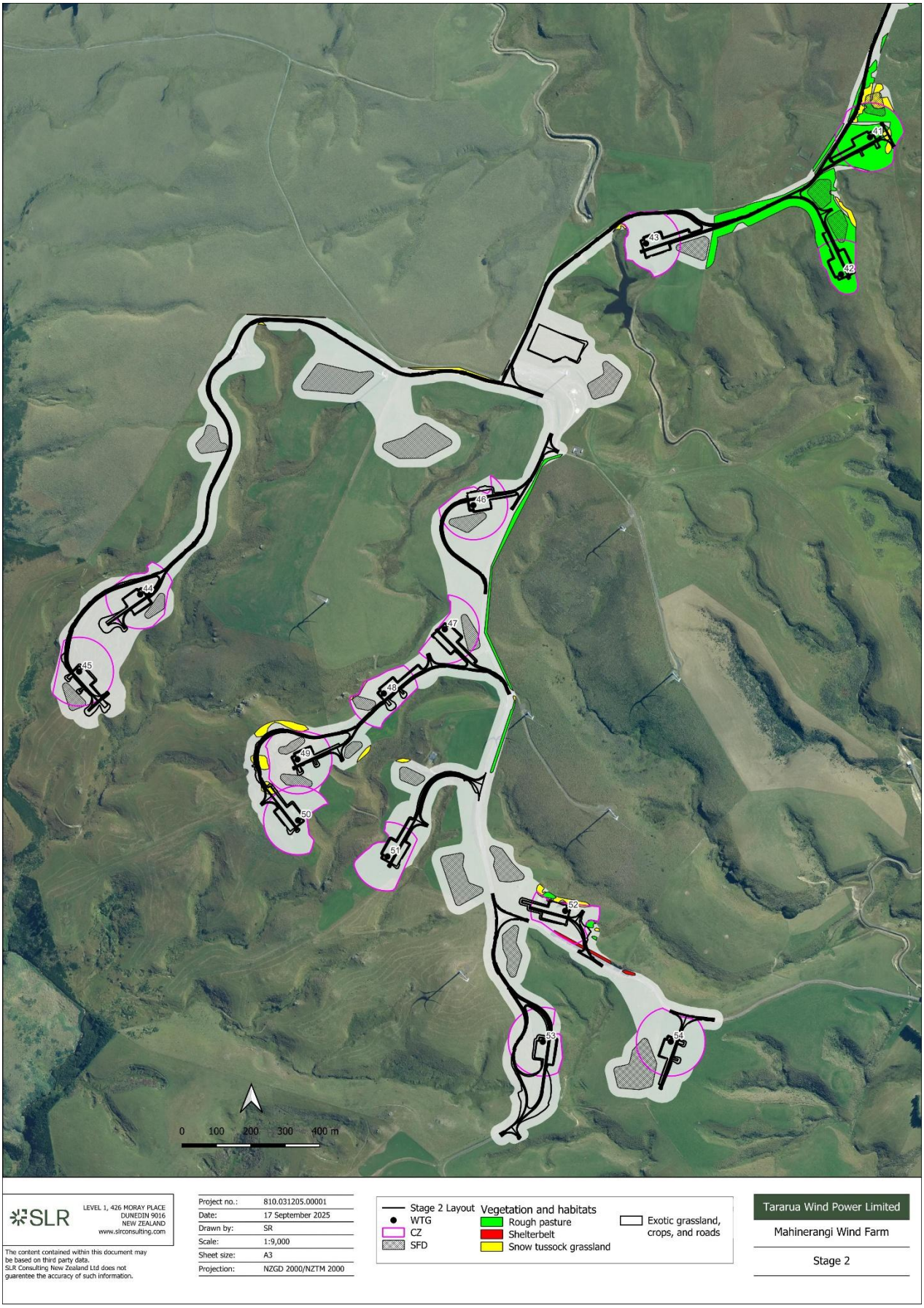

Figure 6. Vegetation and habitats. Figure provided courtesy of SLR.

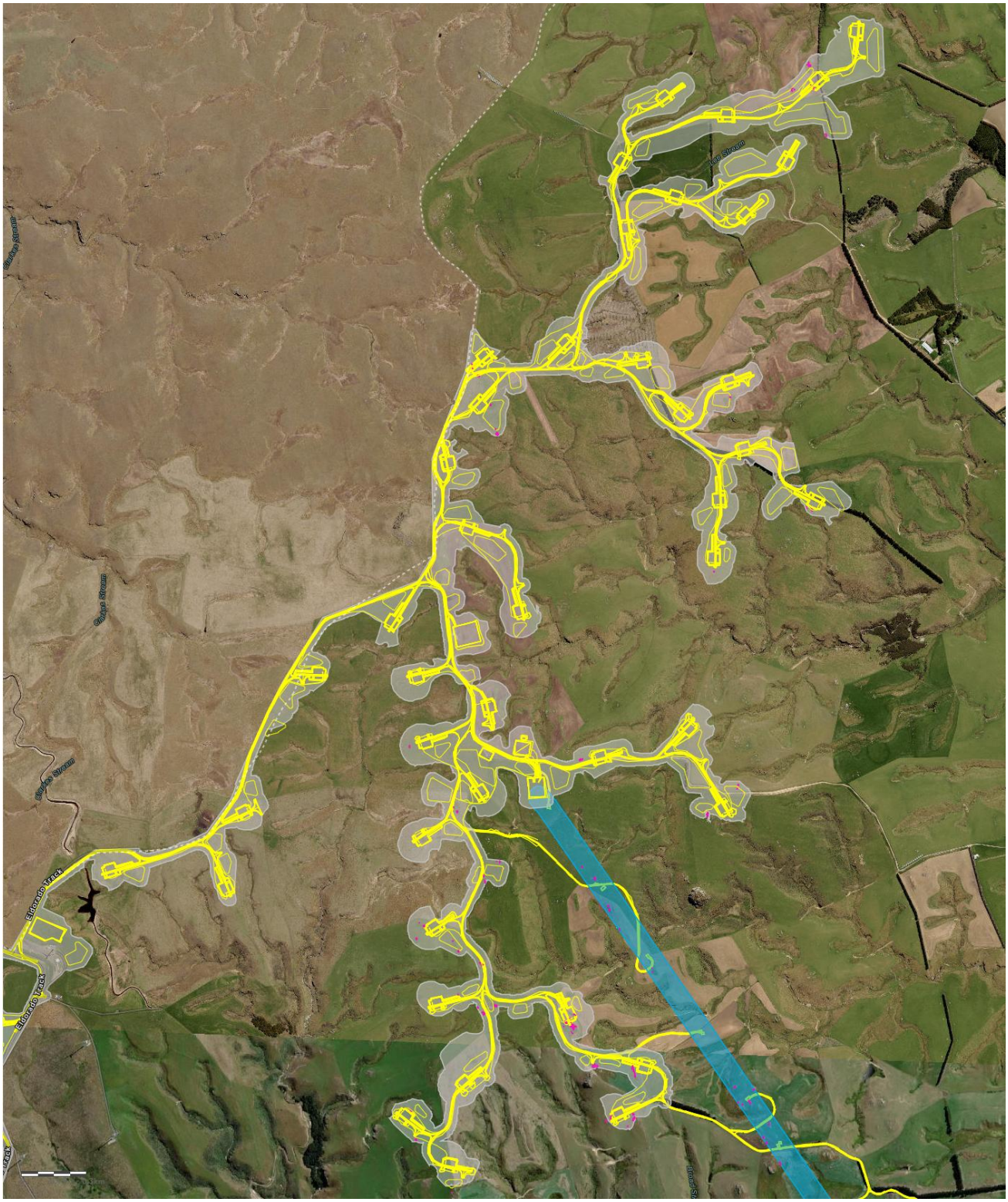

Figure 7. Northern extent of Stage 2 MWF layout (yellow) and Windfarm Development Area (grey), Transmission Line Corridor (blue), rock areas (pink).

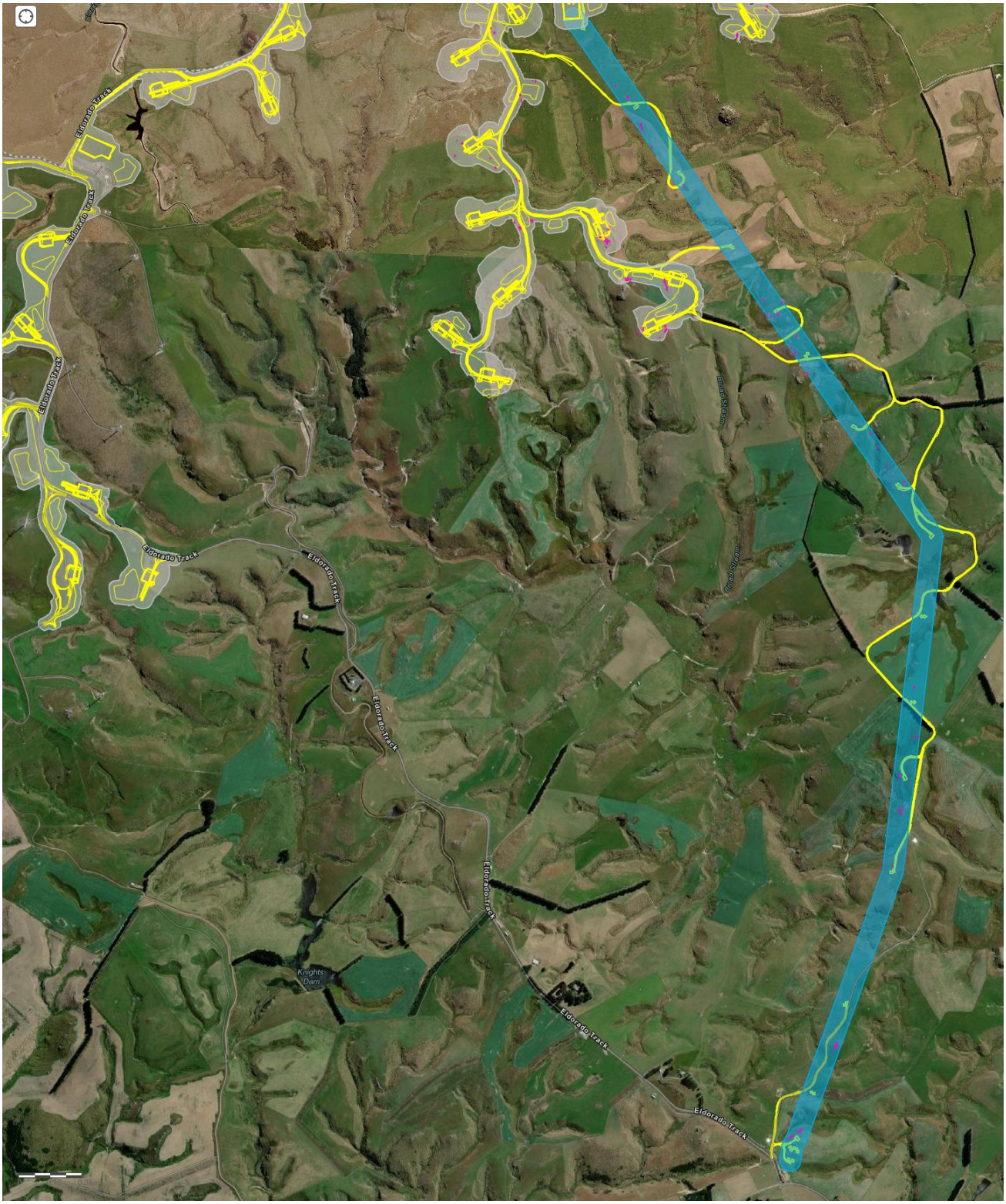

Figure 8. Central extent of Stage 2 MWF layout (yellow) and Windfarm Development Area (grey), Transmission Line Corridor (blue), rock areas (pink).

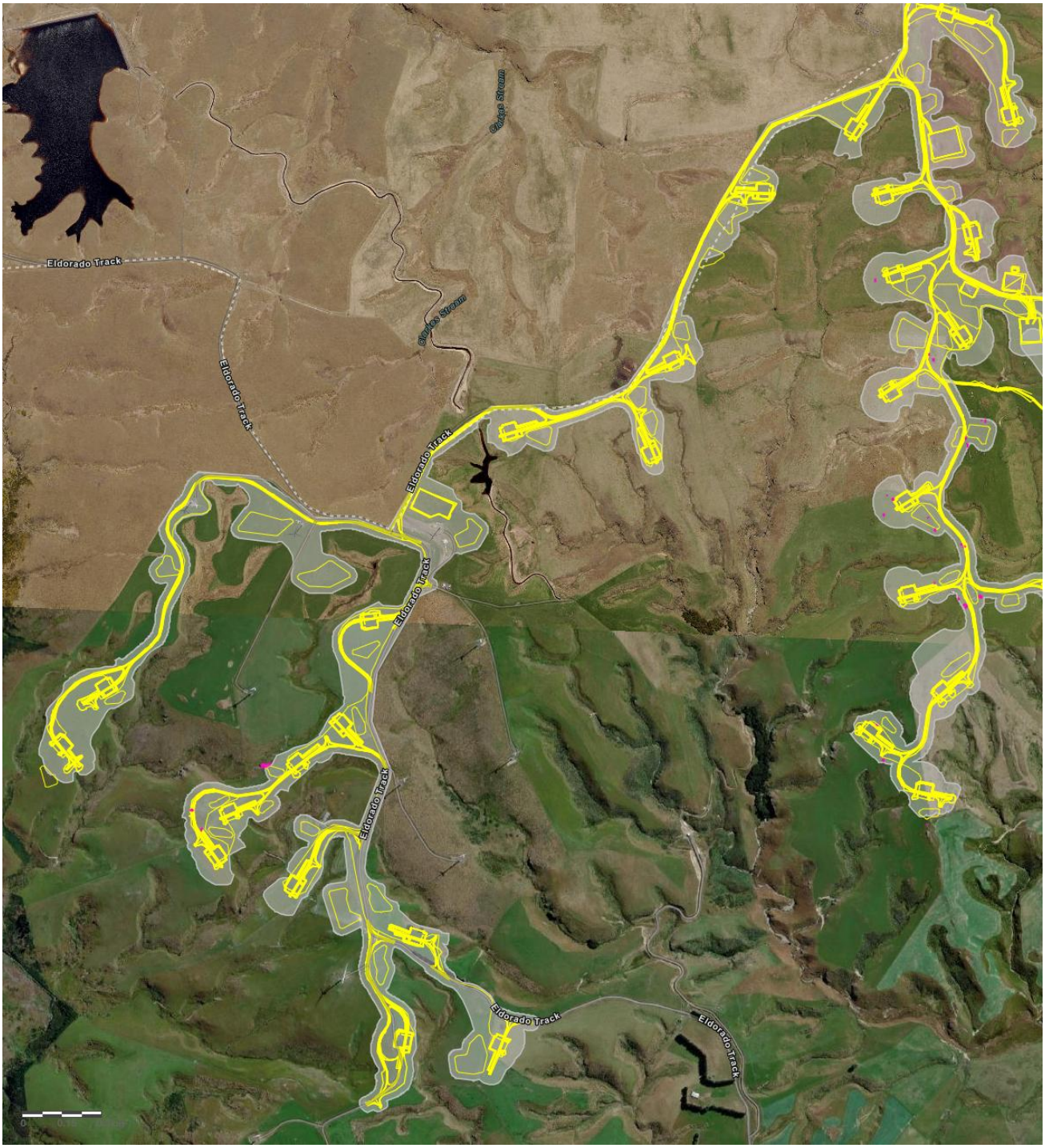

Figure 9. Southern extent of Stage 2 MWF layout (yellow), Windfarm Development Area (grey), rock areas (pink).

5.0 Pre-development Lizard Survey Methodology

All potential lizard habitat types were assessed within the Stage 2 Wind Farm Development Area and Transmission Corridor via a comprehensive lizard survey to determine the suitability and relative abundance of each habitat that supports indigenous lizards (**Figure 10**).

An initial scoping survey was undertaken on 18 December 2024, which included assessing the quality and quantity of potential lizard habitats within the Stage 2 Wind Farm Development Area (WDA). Based on the available habitats a variety of detection methods were decided on by Dr Mandy Tocher and Mr Tony Payne that would maximise encounters of all potential lizard species and effectively sample all seven potential lizard habitats present.

Good practice lizard surveying includes 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 survey timetable for each lizard survey method undertaken is provided in **Table 5**.

Table 5. Timetable for lizard survey

Method	Date Set / Survey	Date of checks
ACOs	11, 13, 14, and 21 March 2025	4 to 6 April 2025 and 13 to 15 April 2025
Gee minnow traps	22 March 2025	23 to 28 March 2025
VES/MHS – MWF site	10-11 April 2025	-
VES/MHS – transmission line corridor and substation	16 March and 11 April 2025	-

ACOs

ACOs were used at 66 focal sites over the Stage 2 WDA (excluding the transmission line and substation). These sites had moderate vegetation cover and provided sunny basking locations for any skinks residing within, sampling:

- 22 wetland margin areas;
- 33 areas of snow tussock grassland;
- 11 areas of rough pasture; and
- one area of forestry.

In total, 570 triple-stacked ACOs were set in clusters of 5, 10 or 20 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 of lizards and density for each monitoring grid using the catch-per-unit-effort (CPUE) indice from a mark-recapture survey.

All devices were left for up to 4 weeks and checked twice a week apart.

Gee's minnow traps

A total of 100 gee's minnow traps were used at 10 focal sites in clusters of 10 over the Stage 2 WDA (excluding the transmission line and substation). The size of clusters was undertaken to enable a measure of relative abundance of lizards. Gee's minnow traps sampled 8 wetlands and the surrounding margins, one area of indigenous shrubland and one area of snow tussock grassland. The sites selected were those with dense ground cover e.g., sedge lands, that could provide habitat for any common skink species present (e.g., tussock skink and McCann's skink) but more importantly, depleted populations of locally rare skink species, e.g., herbfield skink. Traps were open for six consecutive days during weather that was generally suitably for lizard activity. Traps were tucked into available vegetation to provide shade to lizards trapped, and/or vegetation was cut/pulled by hand and placed over the trap to provide shade. To further assist trapped lizards, a moistened sponge was inserted into the traps to provide cover and moisture to captured skinks; the sponge was re-moistened during daily checks, as required. Gee's minnow traps were baited with tinned pear that was replaced every second day.

Visual Encounter Survey or Manual Habitat Search

A total of 127 areas were searched via VES/MHS, sampling the following habitats:

- Snow tussock grassland – 7 locations;
- Wetland – 7 locations;
- Rough pasture – 32 locations;
- Rock (carins, outcrops) – 60 locations;
- Indigenous shrubland – 1 location;
- Pasture/ exotic vegetaion – 16 locations;
- Shelterbelt – 4 locations.

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. For skinks, faecal sign was noted (where present) on top of any cover present (e.g., fence posts, rocks or other farm litter) and for geckos, any sloughed skins were noted beneath rocks in areas of outcropping and/or in bushes in shrublands. Sign (faecal and skin) was way pointed, as well as detections of lizards themselves.

Weather conditions

The lizard survey was started at approximately 9 am each morning and undertaken during days with no rain >0.5 mm and with daytime temperatures ranging from 7°C to 26°C (**Table 6**). 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 Gee's minnow trap. Weather conditions during the survey period are shown in **Table 6**.

Table 6. Daily temperatures during the lizard survey

Date	Temperature °C[8]	Assessments carried out
23/3/25	13-17	Gee's minnow check
24/3/25	9-15	Gee's minnow check
25/3/25	11-17	Gee's minnow check
26/3/25	9-22	Gee's minnow check
27/3/25	9-15	Gee's minnow check
28/3/25	13-16	Gee's minnow check
4/4/25	21-26	ACO check 1
5/4/25	12-15	ACO check 1
6/4/25	9-19	ACO check 1
10/4/25	8-20	VES
11/4/25	14-23	VES
13/4/25	7-17	ACO check 2
14/4/25	11-19	ACO check 2
15/4/25	7-12	ACO check 2

Plate 4. Taking a spot temperature recording using a handheld thermometer during the lizard survey.

[8] Source: https://www.wunderground.com/history/daily/nz/mosgiel/NZDN and spot checks with handheld thermometer.

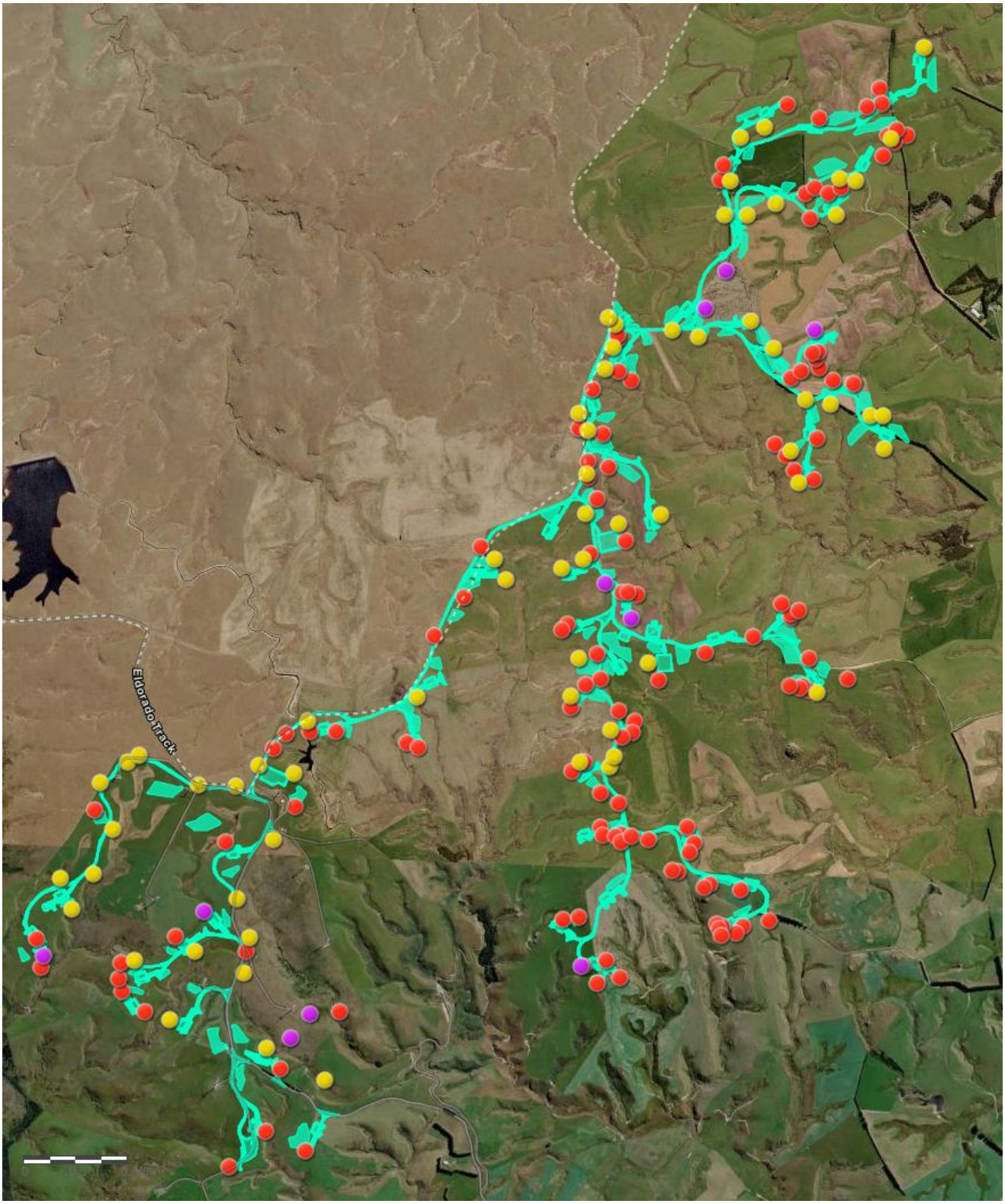

Figure 10. MWF Stage 2 layout (blue), ACO clusters (yellow), minnow traps (purple), Visual Encounter Survey (red).

6.0 Lizard Survey Results

A total of 181 lizards were recorded during the survey including 108 McCann's skinks, 66 tussock skinks, and 14 unidentified skinks (either McCann's skink or tussock skink). 130 lizards were recorded from ACOs, 7 from Gee's minnow traps, and 51 from VES/MHS.

ACOs had an average of 10% occupancy and a maximum of 75% where Site 38 (wetland) recorded 15 skinks from 20 ACO checks.

Gee's minnow trap sites had an average of 1% occupancy and a maximum of 5% at Site 7 (wetland) where 3 tussock skinks were recorded from 60 checks.

Lizards were recorded at 22 of the VES/MHS sites (18%), with a total of 50 McCann's skink and 1 tussock skink. The VES/MHS with the highest abundance of lizards was Site 18 (rough pasture) which recorded 8 McCann's skink.

The survey results reflected the general understanding of both McCann's skink and tussock skink habitat abundance, habitat preferences, and occupancy relative to the works footprint. In general, McCann's skinks tend to be common and widespread over Otago and can persist even at the most degraded sites and tussock skink are less frequently encountered and restricted more to wetlands, snow tussock grassland and rough pasture. As expected, no lizards were recorded within exotic pasture or shelterbelts.

The results indicate that any other rarer potential lizard species known to the Ecological District such as kōrero gecko, jewelled gecko, herbfield skink or Burgan skink are highly unlikely to be present within the Stage 2 Windfarm Development Area 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 indigenous vegetation or rock areas are present, these 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 (**Figures 11** to **13**). This is an assessment based on professional judgement where the following were considered:

- Representativeness: Typical structure, species composition (abundance) and indigenous representation.
- Rarity / distinctiveness: Species of conservation significance, distinctive ecological values.
- Diversity and pattern: Habitat diversity, species diversity and patterns in habitat use.
- Ecological context: Size, shape, ecological networks (e.g., linkages, pathways).

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, grazed exotic pasture and areas of cropping.

2. Low quality habitats are those that recorded no or very few lizards during the lizard survey estimated to be <10 lizards/ ha from a ≤5% habitat occupancy. Approximately 22.3 ha of low-quality habitats will be affected by the Stage 2 MWF and 462 m^2 by the transmission line corridor.

3. Medium quality habitats are those that also recorded relatively few lizards during the survey, estimated to be 400 lizards/ ha from a ≤25% to >5% (CPUE) habitat occupancy. Approximately c. 12.5 ha and 0.37 ha of medium-quality habitats will be affected by the Stage 2 MWF layout and transmission line corridor.

4. High-quality habitats are those that recorded the most lizards during the survey, estimated to be >400 lizards/ ha from >25% habitat occupancy. There is one 1,285 m^2 area of high-quality habitat that will be affected by the Stage 2 MWF layout and there is no high-quality habitat within the transmission line corridor. This includes an area of wetland where the access road crosses the wetland between WTG20 and WTG 21 (red area in **Figure 12**). The extent of high-quality habitats that is affected is dramatically less than the consented layout which authorises works in the Scrappy Pines QEII area and the Thomas Block. Both of these areas have extensive high quality snow tussock habitat.

The survey indicates that the best habitats for lizards are snow tussock grassland and rough pasture which are of relatively similar quality, followed by wetlands and then rock (**Table 7**). Survey results for each method are provided in **Tables 8** to **10**.

Table 7. Habitat quality of each habitat type as indicated by each survey method.

Habitat type	ACOs	Gee's minnow	VES/ MHS
Snow tussock grassland	Low = 12 (36%) Moderate = 18 (55%) High = 3 (9%)	Low = 1 (100%) Moderate = 0 High = 0	Low = 3 (43%) Moderate = 3 (43%) High = 1 (14%)
Wetland	Low = 15 (71%) Moderate = 4 (19%) High = 2 (10%)	Low = 8 (100%) Moderate = 0 High = 0	Low = 6 (86%) Moderate = 1 (14%) High =
Rough pasture	Low = 5 (45.5%) Moderate = 5 (45.5%) High = 1 (9%)	-	Low = 4 (13%) Moderate = 28 (86%) High = 0
Rock	-	-	Low = 56 (93.5%) Moderate = 3 (5%) High = 1 (1.5%)
Indigenous shrubland	-	Low = 1 (100%) Moderate = 0% High = 0%	Low = 1 (100%) Moderate = 0 High = 0
Pasture/ exotic vegetation	-	-	Low = 16 (100%)

			Moderate = 0 High = 0
Shelterbelt	-	-	Low = 4 (100%) Moderate = 0 High = 0

Table 8. Lizard survey results for ACOs. Habitat quality is colour coded, survey locations within the Stage 2 layout are bold. Nil locations are outside the Stage 2 Development Area.

Label	ACOs	McCann's skink	Tussock skink	Unidentified skink	Occupancy (%)	Habitat	Habitat quality	Location	Within Stage 2 layout?	X	Y
1	10	0	0	0	0%	Snow tussock grassland	Low	Nil	No	169.8849263	-45.77806104
2	10	0	0	0	0%	Wetland	Low	Nil	No	169.8805006	-45.77636244
3	10	0	1	0	5%	Snow tussock grassland	Medium	Nil	No	169.8788414	-45.77245901
4	10	0	0	0	0%	Snow tussock grassland	Low	Road	No	169.879241	-45.77055818
5	10	0	2	0	10%	Snow tussock grassland	Medium	Road	No	169.8783773	-45.76851321
6	10	0	0	1	5%	Snow tussock grassland	Medium	Road	No	169.881081	-45.76545217
7	5	1	0	0	10%	Snow tussock grassland	Medium	Road	No	169.8782057	-45.76260054
8	5	0	0	1	10%	Snow tussock grassland	Medium	Road	No	169.8753947	-45.76251447
9	10	0	0	0	0%	Snow tussock grassland	Low	Road	No	169.8710066	-45.76099503
10	10	0	7	1	40%	Wetland	High	Road	No	169.8700997	-45.761343
11	10	0	4	1	25%	Snow tussock grassland	Medium	Road	No	169.8679995	-45.7623965
12	10	0	2	2	20%	Snow tussock grassland	Medium	Road	No	169.8689329	-45.76489263
13	10	0	1	0	5%	Snow tussock grassland	Medium	Road	No	169.8674751	-45.76716693
14	10	0	3	2	25%	Rough pasture	Medium	Road	No	169.8650236	-45.76747752

Label	ACOs	McCann's skink	Tussock skink	Unidentified skink	Occupancy (%)	Habitat	Habitat quality	Location	Within Stage 2 layout?	X	Y
15	10	0	5	0	25%	Snow tussock grassland	Medium	SFD	No	169.8658283	-45.76909781
16	10	0	0	0	0%	Snow tussock grassland	Low	CZ	No	169.8751817	-45.77122754
17	10	0	0	2	10%	Rough pasture	Medium	Road	No	169.8705668	-45.77173173
18	10	0	0	0	0%	Snow tussock grassland	Low	Nil	No	169.8732312	-45.77485707
19	10	0	0	0	0%	Snow tussock grassland	Low	Road	No	169.8798777	-45.76154297
20	10	1	1	1	15%	Snow tussock grassland	Medium	CZ	No	169.8825813	-45.76193218
21	10	0	0	0	0%	Snow tussock grassland	Low	Road	No	169.8835979	-45.75919827
22	10	0	0	0	0%	Wetland	Low	Nil	No	169.8918591	-45.7579033
23	10	0	2	0	10%	Wetland	Medium	Nil	No	169.8986075	-45.75176867
24	10	7	1	2	50%	Snow tussock grassland	High	SFD	No	169.8976889	-45.75069625
25	10	0	1	0	5%	Rough pasture	Low	Road	No	169.9046157	-45.74832021
26	5	1	1	0	20%	Wetland	Medium	Nil	No	169.9044044	-45.75067718
27	**10**	**3**	**0**	**0**	**15%**	**Snow tussock grassland**	**Medium**	**CZ**	**Yes**	**169.902833**	**-45.7511338**
28	**10**	**1**	**0**	**0**	**5%**	**Rough pasture**	**Low**	**SFD**	**Yes**	**169.90404**	**-45.7559202**
29	**10**	**1**	**0**	**0**	**5%**	**Rough pasture**	**Low**	**CZ**	**Yes**	**169.903396**	**-45.7578964**
30	**10**	**1**	**1**	**0**	**10%**	**Rough pasture**	**Medium**	**SFD**	**Yes**	**169.906459**	**-45.7596873**
31	5	0	0	0	0%	Wetland	Low	Nil	No	169.906754	-45.76103457
32	5	0	0	0	0%	Wetland	Low	Road	No	169.9063571	-45.76160343

Label	ACOs	McCann's skink	Tussock skink	Unidentified skink	Occupancy (%)	Habitat	Habitat quality	Location	Within Stage 2 layout?	X	Y
33	10	0	0	0	0%	Snow tussock grassland	Low	CZ	No	169.9041737	-45.76137514
34	10	0	0	0	0%	Wetland	Low	Nil	No	169.9093558	-45.75612419
35	10	0	0	0	0%	Wetland	Low	Nil	No	169.922048	-45.75766622
36	10	0	0	0	0%	Wetland	Low	Nil	No	169.9070985	-45.74886976
37	10	10	1	0	55%	Rough pasture	High	Road	No	169.9046424	-45.74617262
38	10	4	0	0	20%	Snow tussock grassland	Medium	CZ	No	169.9102659	-45.74833651
38	**10**	**1**	**13**	**1**	**75%**	**Wetland**	**High**	**Road**	**Yes**	**169.904942**	**-45.7439235**
39	10	0	0	0	0%	Snow tussock grassland	Low	Road	No	169.9040942	-45.74300626
40	**5**	**0**	**0**	**0**	**0%**	**Snow tussock grassland**	**Low**	**Road**	**Yes**	**169.906052**	**-45.7407188**
41	**5**	**1**	**3**	**0**	**40%**	**Snow tussock grassland**	**High**	**SFD**	**Yes**	**169.906626**	**-45.7395237**
42	**10**	**2**	**0**	**0**	**10%**	**Snow tussock grassland**	**Medium**	**CZ**	**Yes**	**169.906798**	**-45.7383706**
43	10	4	2	0	30%	Snow tussock grassland	High	SFD	No	169.9062453	-45.73802428
44	**10**	**3**	**0**	**0**	**15%**	**Snow tussock grassland**	**Medium**	**Road**	**Yes**	**169.911046**	**-45.7386945**
45	5	0	0	0	0%	Snow tussock grassland	Low	SFD	Yes	169.9130581	-45.73898649
46	**10**	**3**	**0**	**0**	**15%**	**Forestry**	**Medium**	**CZ**	**Yes**	**169.917073**	**-45.7381815**
47	5	0	0	0	0%	Wetland	Low	Road	No	169.918727	-45.73962389
48	**20**	**4**	**1**	**0**	**13%**	**Snow tussock grassland**	**Medium**	**Road**	**Yes**	**169.921174**	**-45.7422994**

Label	ACOs	McCann's skink	Tussock skink	Unidentified skink	Occupancy (%)	Habitat	Habitat quality	Location	Within Stage 2 layout?	X	Y
49	10	0	2	0	10%	Snow tussock grassland	Medium	SFD	No	169.9200205	-45.74503813
50	**10**	**0**	**3**	**0**	**15%**	**Snow tussock grassland**	**Medium**	**CZ**	**Yes**	**169.920596**	**-45.7467037**
52	10	0	0	0	0%	Snow tussock grassland	Low	Nil	No	169.9269973	-45.74481347
53	5	0	0	0	0%	Wetland	Low	Road	No	169.9259834	-45.74314568
54	5	0	0	0	0%	Wetland	Low	Road	No	169.9269598	-45.74312696
55	5	0	0	0	0%	Wetland	Low	Nil	No	169.9230732	-45.7425013
56	5	0	0	0	0%	Wetland	Low	Nil	No	169.9166881	-45.73259598
57	10	5	0	0	25%	Rough pasture	Medium	Road	No	169.9150198	-45.73259598
58	5	1	0	0	10%	Wetland	Medium	CZ	No	169.9189331	-45.73200436
59	10	0	3	0	15%	Wetland	Medium	Road	No	169.915456	-45.73076969
60	5	0	0	0	0%	Wetland	Low	Road	No	169.916207	-45.72848361
61	5	0	0	0	0%	Rough pasture	Low	Nil	No	169.9180711	-45.72798744
62	5	0	0	0	0%	Wetland	Low	Road	No	169.9237333	-45.7306948
63	5	0	0	0	0%	Wetland	Low	Nil	No	169.9249188	-45.73079591
64	10	0	0	0	0%	Rough pasture	Low	CZ	No	169.9234878	-45.73254984
65	5	0	0	0	0%	Snow tussock grassland	Low	SFD	No	169.9275796	-45.72856412
66	5	2	0	0	20%	Rough pasture	Medium	CZ	No	169.9300746	-45.72378135

Table 9. Lizard survey results for Gee's minnows. Habitat quality is colour coded, survey locations within the Stage 2 layout are bold. Nil locations are outside the Stage 2 Development Area.

Label	McCann's skink	Tussock skink	Occupancy (%)	Habitat	Habitat quality	Location	Within Stage 2 layout?	X	Y
1	0	0	0%	Snow tussock grassland	Low	Nil	No	169.882381	-45.77588844
2	0	1	2%	Wetland	Low	Nil	No	169.8837436	-45.77463128
3	0	0	0%	Wetland	Low	CZ	No	169.8759437	-45.76914584
4	0	0	0%	Indigenous shrubland	Low	CZ	No	169.8637504	-45.77150351
5	0	1	2%	Wetland	Low	Road	No	169.9043054	-45.77206823
6	1	0	2%	Wetland	Low	CZ	No	169.9079819	-45.75377724
7	0	3	5%	Wetland	Low	Road	No	169.9060447	-45.75195908
8	0	0	0%	Wetland	Low	Road	No	169.9135956	-45.73754847
9	**0**	**0**	0%	**Wetland**	**Low**	**Road**	**Yes**	**169.915226**	**-45.7355641**
10	1	0	2%	Wetland	Low	CZ	No	169.9218729	-45.73864547

Table 10. Lizard survey results for Visual Encounter Surveys. Habitat quality is colour coded, survey locations within the Stage 2 layout are bold. Nil locations are outside the Stage 2 Development Area.

Label	McCann's skink	Tussock skink	Habitat	Habitat quality	Location	Within Stage 2 layout?	X	Y
1	0	0	Rough pasture	Low	CZ	No	169.8804677	-45.78076002
2	**0**	**0**	**Rough pasture**	**Low**	**Road**	**Yes**	**169.881541**	**-45.77745647**
3	0	0	Rough pasture	Low	CZ	No	169.8712918	-45.77448759
4	**0**	**0**	**Rock**	**Low**	**Road**	**Yes**	**169.869628**	**-45.77337127**
5	**0**	**0**	**Rock**	**Low**	**Road**	**Yes**	**169.869313**	**-45.77261638**
6	**0**	**0**	**Rock**	**Low**	**Road**	**Yes**	**169.869627**	**-45.77204389**
7	0	0	Rock	Low	SFD	No	169.8736822	-45.77052191
8	0	0	Snow tussock grassland	Low	Road	No	169.8790413	-45.77128525
9	0	0	Wetland	Low	Nil	No	169.8775124	-45.76549636
10	0	0	Rough pasture	Low	SFD	No	169.8676285	-45.76382545

Label	McCann's skink	Tussock skink	Habitat	Habitat quality	Location	Within Stage 2 layout?	X	Y
11	**0**	**0**	**Pasture/ exotic vegetation**	**Low**	**CZ**	**Yes**	**169.863307**	**-45.77065475**
12	0	0	Indigenous shrubland	Low	Nil	No	169.8635435	-45.77212528
13	0	0	Rock	High	Nil	No	169.8860101	-45.77453626
14	0	0	Pasture/ exotic vegetation	Low	SFD	No	169.8826842	-45.76368084
15	1	0	Rough pasture	Low	Road	No	169.8811151	-45.76059708
16	**0**	**0**	**Pasture/ exotic vegetation**	**Low**	**Road**	**Yes**	**169.882032**	**-45.7598598**
17	0	0	Rough pasture	Low	CZ	No	169.8837866	-45.75971758
18	**0**	**0**	**Pasture/ exotic vegetation**	**Low**	**SFD**	**Yes**	**169.885753**	**-45.75976249**
19	**8**	**0**	**Rough pasture**	**Medium**	**CZ**	**Yes**	**169.891163**	**-45.76030142**
20	**5**	**0**	**Rough pasture**	**Medium**	**CZ**	**Yes**	**169.891965**	**-45.76055404**
21	1	0	Snow tussock grassland	Medium	Road	No	169.8930965	-45.75475469
22	**6**	**0**	**Rough pasture**	**Medium**	**SFD**	**Yes**	**169.895317**	**-45.75265487**
23	0	0	Snow tussock grassland	Low	Road	No	169.8966344	-45.75006836
25	1	0	Rough pasture	Low	Nil	No	169.9075671	-45.74975018
26	0	0	Rough pasture	Low	SFD	No	169.9054374	-45.74756033
26	1	0	Rock	Low	Nil	No	169.9048527	-45.75031167
27	**1**	**0**	**Rock**	**Low**	**CZ**	**Yes**	**169.907366**	**-45.75244141**
28	**0**	**0**	**Rock**	**Low**	**CZ**	**Yes**	**169.90767**	**-45.75240024**
29	0	0	Rough pasture	Low	CZ	No	169.9084038	-45.75256306
30	**0**	**0**	**Rough pasture**	**Low**	**CZ**	**Yes**	**169.903213**	**-45.75407852**

Label	McCann's skink	Tussock skink	Habitat	Habitat quality	Location	Within Stage 2 layout?	X	Y
31	0	0	Rock	Low	CZ	No	169.9027986	-45.75438731
32	0	0	Wetland	Low	Road	No	169.9054281	-45.75569086
33	1	0	Rock	Low	Road	No	169.9056592	-45.75697634
34	0	0	Wetland	Low	Road	No	169.9046195	-45.75728077
35	**0**	**0**	**Rough pasture**	**Low**	**CZ**	**Yes**	**169.903439**	**-45.75845972**
36	0	0	Rock	Low	Road	No	169.9071032	-45.75863563
37	0	0	Rock	Low	SFD	No	169.9082592	-45.75920638
38	**0**	**0**	**Pasture/ exotic vegetation**	**Low**	**SFD**	**Yes**	**169.908128**	**-45.75979023**
39	0	0	Rock	Low	Road	No	169.9073446	-45.76004285
40	0	0	Rough pasture	Low	CZ	No	169.9099353	-45.75700552
41	0	0	Rough pasture	Low	Nil	No	169.9136046	-45.75557763
42	**1**	**0**	**Rough pasture**	**Low**	**Road**	**Yes**	**169.917195**	**-45.75477631**
43	**0**	**0**	**Pasture/ exotic vegetation**	**Low**	**SFD**	**Yes**	**169.92008**	**-45.75376665**
44	**0**	**0**	**Pasture/ exotic vegetation**	**Low**	**CZ**	**Yes**	**169.920074**	**-45.75358699**
45	0	0	Rough pasture	Low	CZ	No	169.9206161	-45.7533961
46	**0**	**0**	**Rough pasture**	**Low**	**CZ**	**Yes**	**169.919329**	**-45.75303864**
47	0	0	Rough pasture	Low	Road	No	169.9214143	-45.75591985
48	2	0	Rock	Low	Nil	No	169.9199659	-45.75737018
49	**0**	**0**	**Rock**	**Low**	**SFD**	**Yes**	**169.920685**	**-45.75748246**
50	3	0	Rock	Medium	Nil	No	169.9209798	-45.7573103
51	0	0	Rough pasture	Low	CZ	No	169.9213821	-45.75757977
52	0	0	Rough pasture	Low	Nil	No	169.9242843	-45.75700339
53	0	0	Wetland	Low	Nil	No	169.9045087	-45.7613619
54	1	0	Rock	Low	CZ	No	169.9036611	-45.76187649

Label	McCann's skink	Tussock skink	Habitat	Habitat quality	Location	Within Stage 2 layout?	X	Y
55	2	0	Rock	Low	SFD	No	169.905713	-45.7629936
56	**1**	**0**	**Rock**	**Low**	**Road**	**Yes**	**169.907102**	**-45.76348291**
57	0	0	Rock	Low	Road	No	169.9057251	-45.76476184
58	0	0	Rock	Low	Road	No	169.9059182	-45.76514729
59	**0**	**0**	**Pasture/ exotic vegetation**	**Low**	**Road**	**Yes**	**169.907274**	**-45.76512398**
60	0	0	Rock	Low	SFD	No	169.9080093	-45.76521753
61	0	0	Rock	Low	Nil	No	169.9068184	-45.76524747
62	0	0	Rock	Low	SFD	No	169.9072368	-45.76554124
63	**0**	**0**	**Rock**	**Low**	**SFD**	**Yes**	**169.909316**	**-45.76540652**
64	0	0	Rock	Low	Road	No	169.9122392	-45.76475911
65	**0**	**0**	**Rock**	**Low**	**CZ**	**Yes**	**169.912722**	**-45.76558053**
66	**0**	**0**	**Rock**	**Low**	**CZ**	**Yes**	**169.912419**	**-45.76601836**
67	0	0	Rock	Low	Nil	No	169.9115042	-45.76707552
68	0	0	Rock	Low	Nil	No	169.9110831	-45.7669988
69	0	0	Rock	Low	Road	No	169.9139477	-45.76775283
70	0	0	Rock	Low	SFD	No	169.9135427	-45.76795116
71	0	0	Rock	Low	CZ	No	169.9162652	-45.76796987
72	0	0	Rock	Low	Nil	No	169.9183922	-45.76966498
73	0	0	Rock	Low	CZ	No	169.916351	-45.76995124
74	0	0	Rock	Low	CZ	No	169.9159057	-45.77031233
75	**0**	**0**	**Rock**	**Low**	**CZ**	**Yes**	**169.914932**	**-45.76997369**
76	0	0	Rock	Low	CZ	No	169.9146746	-45.77007847
77	0	0	Rock	Low	Nil	No	169.9144654	-45.76987453
78	0	0	Rock	Low	Nil	No	169.9147819	-45.77043207
79	0	0	Rock	Low	Nil	No	169.9047564	-45.74638866
80	0	0	Rock	Low	Road	No	169.904751	-45.74556321
81	2	0	Rough pasture	Low	CZ	No	169.9062544	-45.74584304
82	4	1	Snow tussock grassland	High	SFD	No	169.905789	-45.74411351
83	0	0	Wetland	Medium	Nil	No	169.9040671	-45.74381495
84	**5**	**0**	**Snow tussock grassland**	**Medium**	**Road**	**Yes**	**169.905053**	**-45.74177088**

Label	McCann's skink	Tussock skink	Habitat	Habitat quality	Location	Within Stage 2 layout?	X	Y
85	0	0	Snow tussock grassland	Low	CZ	No	169.9070135	-45.74083867
86	0	0	Rock	Low	SFD	No	169.9080059	-45.74129354
87	0	0	Rock	Low	Nil	No	169.9070188	-45.73913893
88	**1**	**0**	**Rock**	**Low**	**Road**	**Yes**	**169.906909**	**-45.73888809**
89	0	0	Wetland	Low	Road	No	169.9247321	-45.74147699
90	0	0	Rough pasture	Medium	Nil	No	169.9231175	-45.74126172
91	0	0	Rock	Low	Nil	No	169.9221894	-45.74064024
92	**0**	**0**	**Rock**	**Low**	**SFD**	**Yes**	**169.921943**	**-45.74017226**
93	**0**	**0**	**Rock**	**Low**	**SFD**	**Yes**	**169.922074**	**-45.73981471**
94	**0**	**0**	**Rock**	**Low**	**SFD**	**Yes**	**169.921709**	**-45.73984279**
95	0	0	Pasture/ exotic vegetation	Low	Road	No	169.920741	-45.74080872
96	0	0	Rough pasture	Low	Road	No	169.9200812	-45.74115689
97	0	0	Rough pasture	Low	CZ	No	169.9219469	-45.74433438
98	0	0	Rock	Medium	Nil	No	169.9188651	-45.74464885
99	1	0	Rock	Medium	Nil	No	169.9197127	-45.74525531
100	0	0	Snow tussock grassland	Medium	CZ	No	169.920292	-45.74603022
101	**0**	**0**	**Rough pasture**	**Low**	**SFD**	**Yes**	**169.921762**	**-45.74652436**
102	0	0	Pasture/ exotic vegetation	Low	Road	No	169.9147133	-45.73071469
103	0	0	Shelterbelt	Low	CZ	No	169.9149816	-45.72995267
104	0	0	Rough pasture	Low	Road	No	169.9197761	-45.72682888
105	0	0	Pasture/ exotic vegetation	Low	CZ	No	169.9221553	-45.72751043
106	**0**	**0**	**Rock**	**Low**	**SFD**	**Yes**	**169.92583**	**-45.72690191**
107	0	0	Rock	Low	SFD	No	169.9267231	-45.72598255
108	**0**	**0**	**Rock**	**Low**	**Road**	**Yes**	**169.926935**	**-45.72672965**
109	0	0	Rough pasture	Low	SFD	No	169.9276216	-45.72841665

Label	McCann's skink	Tussock skink	Habitat	Habitat quality	Location	Within Stage 2 layout?	X	Y
110	1	0	Rock	Low	SFD	No	169.9273534	-45.72840542
111	0	0	Rock	Low	SFD	No	169.9277906	-45.72877989
112	0	0	Rough pasture	Low	Nil	No	169.9269993	-45.72948929
113	**0**	**0**	**Shelterbelt**	**Low**	**SFD**	**Yes**	**169.928029**	**-45.7281358**
114	**0**	**0**	**Rock**	**Low**	**SFD**	**Yes**	**169.928791**	**-45.7284541**
115	0	0	Pasture/ exotic vegetation	Low	Road	No	169.921769	-45.73118183
116	1	0	Rough pasture	Low	SFD	No	169.9228312	-45.73149636
117	0	0	Rough pasture	Low	Road	No	169.9237485	-45.73118183
118	0	0	Shelterbelt	Low	Road	No	169.9211092	-45.73145143
119	0	0	Shelterbelt	Low	Road	No	169.921474	-45.73277696
120	0	0	Rock	Low	SFD	No	169.9040503	-45.76953856
121	**0**	**0**	**Rock**	**Low**	**CZ**	**Yes**	**169.902859**	**-45.76964333**
122	0	0	Wetland	Low	Road	No	169.9043776	-45.7720905
123	0	0	Rock	Low	SFD	No	169.9053914	-45.7730147
124	0	0	Pasture/ exotic vegetation	Low	Nil	No	169.9071617	-45.77265924
125	0	0	Pasture/ exotic vegetation	Low	CZ	No	169.9061425	-45.77179116
126	0	0	Pasture/ exotic vegetation	Low	SFD	No	169.8834074	-45.78177761
127	0	0	Pasture/ exotic vegetation	Low	Road	No	169.8777318	-45.78257821

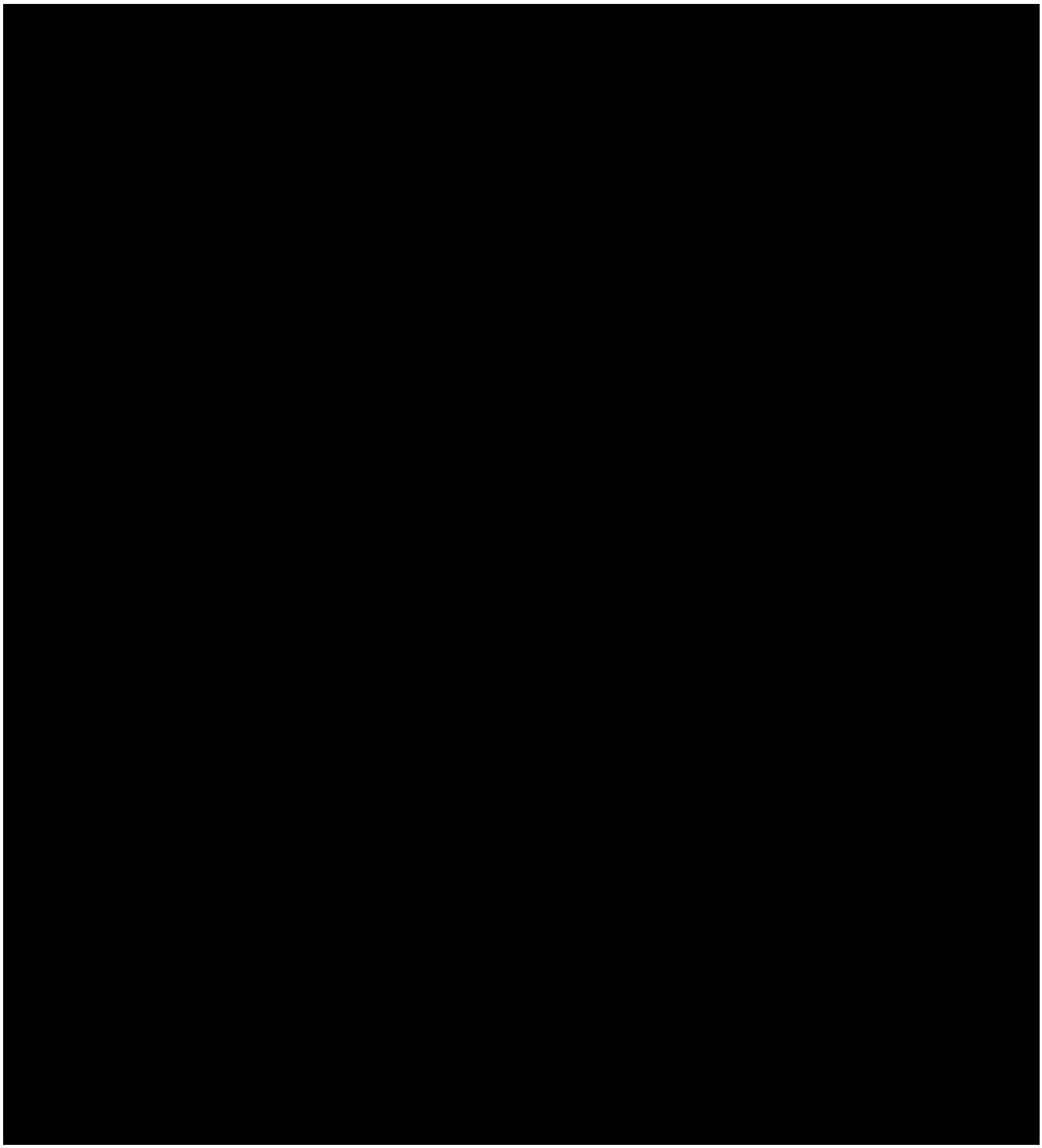

Figure 11. Habitat quality within the northern extent of the Stage 2 MWF layout. No habitat (yellow), poor quality habitat (green), moderate quality habitat (orange), high quality habitat (red). Location of ACO, Gee's minnow or VES/MHS survey (circle) and habitat quality result (green=low quality, orange = moderate quality, red = high quality). Contingency Zone (white).

Figure 12. Habitat quality within the central extent of the Stage 2 MWF layout and Transmission Line layout. No habitat within Stage 2 MWF layout (yellow), No habitat within Transmission Corridor and access tracks (blue), poor quality habitat (green), moderate quality habitat (orange). Location of ACO, Gee's minnow or VES/MHS survey (circle) and habitat quality result (green=low quality, orange = moderate quality, red = high quality). Contingency Zone (white).

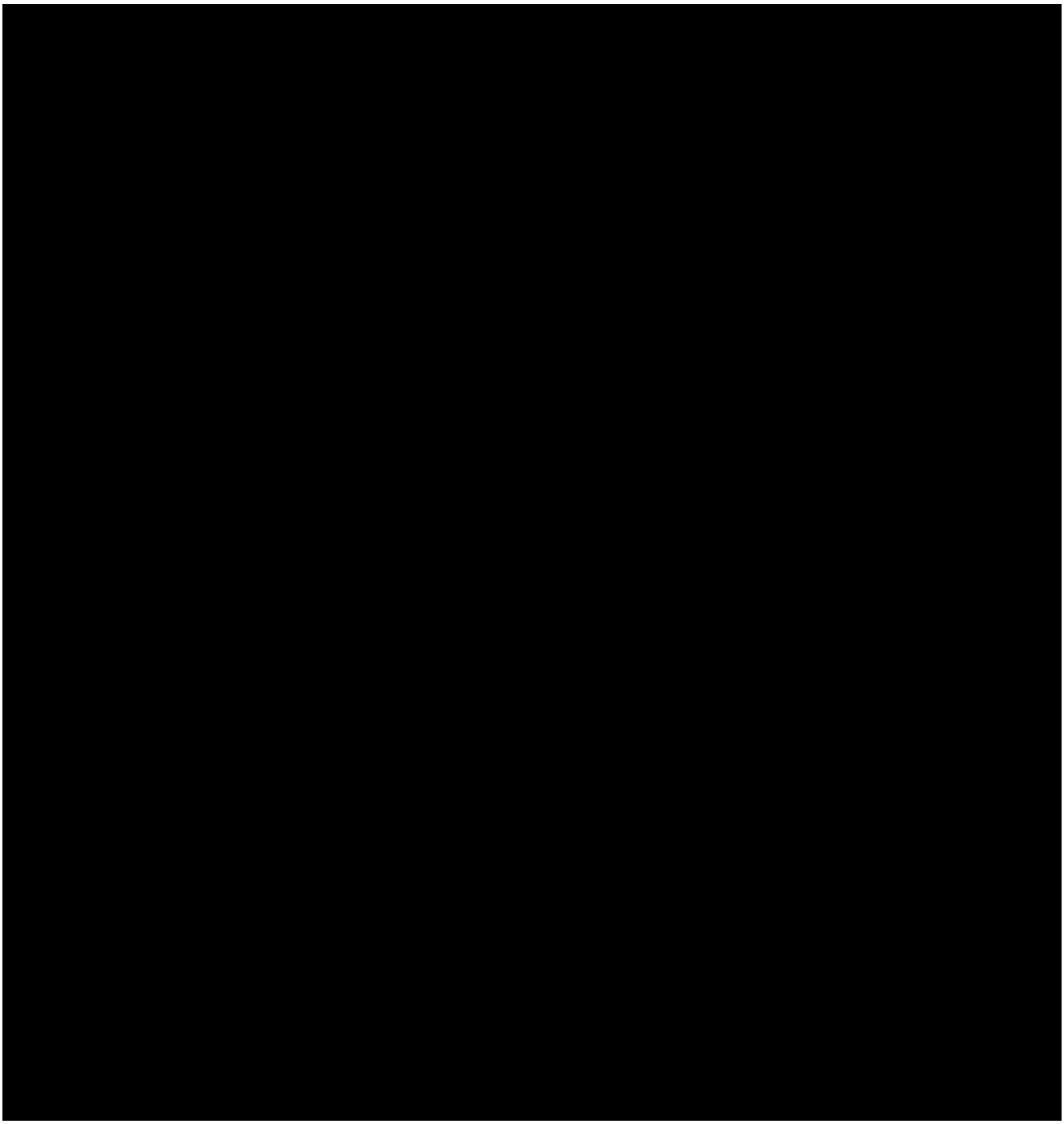

Figure 13. Habitat quality within the northern extent of the Stage 2 MWF layout. No habitat (yellow), poor quality habitat (green), moderate quality habitat (orange). Location of ACO, Gee's minnow or VES/MHS survey (circle) and habitat quality result (green=low quality, orange = moderate quality, red = high quality). Contingency Zone (white).

7.0 Lizard Management

7.1 Avoidance and minimisation

The Stage 2 layout and the new activities proposed such as the transmission line and BESS, avoid disturbance to higher quality lizard habitats. For example, no development is proposed within the Thomas Block and the layout encompasses all areas and values for lizards that can be avoided to the extent practicable.

The clearance of vegetation on site has the potential to disturb, injure and/ or kill lizards that are residing within the site, which have been confirmed within c. 35 ha of snow tussock grassland, rough pasture, wetlands, plantation forest and rock habitats within the Stage 2 indicative windfarm layout and wider turbine Contingency Zones.

To minimise adverse effects to lizards a lizard salvage is proposed. The lizard salvage will relocate native lizards away from locations which will be impacted by physical works and vegetation clearance. Any lizards residing in moderate and high-quality habitats that will be affected by construction works will be the focus of relocation efforts (**Figures 11** to **13**). Lizards will be caught using a combination of hand-searching, and trapping within the vegetation clearance area.

Lizards will be released into a pre-determined release site (discussed in Section 9), which satisfy all habitat requirements (food, refugia) of the relocated lizards. If lizards are placed into habitats where resident lizards are currently present in high numbers, or are relocated into habitat without adequate refuge, individuals may become displaced and are then vulnerable to predation.

Creation and enhancement of habitat at the release site in combination with predator control are critical tools to reduce mortality after a lizard salvage. These considerations have been included in this LMP.

Overall, the lizard salvage will minimise most adverse effects to lizards associated with disturbance, accidental harm or killing through an extensive and thorough trapping programme. Avoidance and minimisation measures cannot result in no-net-loss of lizards from the development area. Therefore, mitigation measures are proposed to achieve a net-gain in lizard values and an overall protective benefit to lizards.

7.2 Compensation

After avoidance and minimisation measures have been implemented, substantial compensation will be undertaken to contribute to achieving a net-gain in lizard values and an overall protective benefit. To result in a no-net-loss in values for lizards, and in this instance a net-gain, the loss of c. 22.3 ha of low quality, c. 12.5 ha of moderate quality, and 1,285 m^2 of high-quality habitat, has been redressed in advance by TWP by creating a 59.2 ha of high-quality habitat within the "Scrappy Pines Block" QEII Open Space Covenant. Over the past 15 years, management within this area has included the clearance of hectares of wilding pines, and retirement of grazed pasture which has subsequently developed into indigenous vegetation dominated by dense snow tussock grassland and golden spaniard (**Figure 14**). Overall, this provides excellent habitat for lizards and offsets the effects of the loss of habitat at a 1.6:1 ratio such that there is a long-term positive effect with regards to lizard habitat values.

An additional benefit of the regeneration of indigenous vegetation and all the woody debris is that this has created many hectares of additional high-quality lizard habitat which means that there are sufficient

resources for relocated lizards and consequently the carrying capacity[9] of the site is expected to be very high and much greater than the existing population levels. In addition to the increase in suitable habitat, ongoing predator control has been undertaken, and it has been demonstrated that a significant increase in lizard numbers can be achieved in areas subject to intensive mammalian predator control (Reardon et al., 2012; Norbury et al., 2022).

Further to the "Scrappy Pines Block", TWP is also creating a 4.6 ha compensation site for wetland effects (**Figure 19**). This area will be protected for the life of the wind farm, and over time the c. 2.3 ha of terrestrial riparian margins will provide further high-quality habitat for lizards. This area will also be used a contingency release site for lizards once vegetation has established.

[9] Carrying capacity of a site is determined based on the size site, the estimated size of the resident lizard population, and expected lizard population response to management.

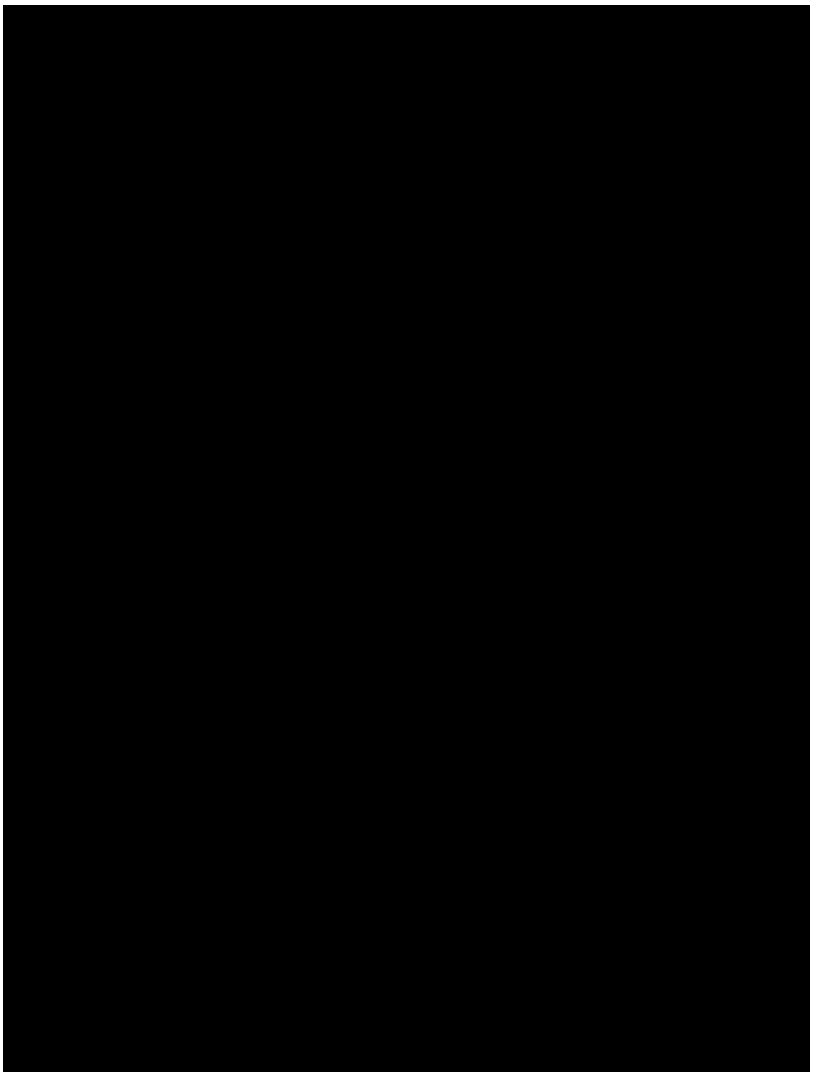

Figure 14. [redacted]

Figure 15. [redacted]

Plate 5. [redacted]" (Golder Associates 2010).

Plate 6. [redacted]

8.0 Lizard salvage

8.1 Approach

The approach for this Lizard Management Plan is guided by DOC's Principles, the Lizard Assessment (Blueprint Ecology, 2025), release site survey, nearby lizard records, the history of the development site and release site, and the known preferred habitats for lizards. The mosaic of modified vegetation and the uneven distribution of lizards within Stage 2 requires a targeted salvage approach focusing effort on the best available habitats for lizards.

The number of McCann's skink and tussock skink recorded during the pre-development survey indicates that there could be a reasonable sized population that is permanent and self-sustaining. Based on the size (c. 12.6 ha) and quality of the habitats which have an average CPUE of 11%, it is estimated that between 4,000 and 5,000 lizards could be present within the Stage 2 site, at an approximate 3:1 of McCann's skink to tussock skink.

No other species are expected due to the site context and the results of the 2025 lizard survey which yielded no records from 670 devices and 127 Visual Encounter Sites, where the best examples of each habitat type were thoroughly surveyed.

8.2 Timing

Lizard capture, handling and relocation will be undertaken at a suitable time of year, between the months of October and April inclusive, in weather conditions suitable for lizard salvage. For the avoidance of doubt, that is only temperatures of 12° C and above, preferably with no more than light winds, and <5 mm rain. These conditions must be forecast for a period of time long enough to allow for the salvage and post release settling in period of lizards.

8.3 Salvage Method

The following methods will be used to salvage lizards at the site:

1. Artificial Cover Objects (ACOs): ACOs are an effective means of salvaging skinks (and sometimes geckos) when there is a local abundance of habitat (as is the case within the rough pasture/low weedland areas of this site). ACOs comprise 475 mm x 500 mm sheets of corrugated Onduline™ (a bitumen saturated material) laid in double or triple stacks with a 10 mm gap between the sheets or between the sheet and the ground. ACOs will be installed in areas of moderate and high-quality habitat where lizard encounters are considered most likely, including where vegetation is dense and supports good ground cover for skinks. A 5-10 m grid network of ACOs will be set in the best areas of suitable habitat, and a minimum of 600 devices will be used (**Figure 16**).
   ACOs will be set and left on site for a minimum of four weeks prior to the salvage commencing to allow colonisation by lizards. All devices will be checked a minimum of five times or until at least two unsuccessful salvage attempts within a cluster of 20 ACOs is observed. Trapping will continue if any tussock skink are captured, or if the overall CPUE is >10%. A salvage effort of at least 3,000 device checks is expected.
   ACOs will be checked (and any lizards present captured) on fine, mild days when weather conditions mean that they are most likely to be occupied. To maximise the number of salvaged

animals, the salvage will be undertaken over multiple 'salvage events' allowing time between checks to minimise 'trap shyness'. At least one ACO check will be no more than 1 week prior to the start of vegetation clearance at the site.

2. Systematic manual search: Destructive hand-searching of rock habitats will be undertaken within the rock environments.

Figure 16. Indicative numbers of ACO's to be used for the lizard salvage within medium and high-quality habitats.

8.4 Development Site Management

The project herpetologist for this project is Tony Payne:

Email: [redacted]

phone: [redacted]

Prior to vegetation clearance and earthworks commencing the project herpetologist will have a toolbox meeting with contractors to describe the process if any lizards are accidentally encountered during construction. If any lizards are accidentally encountered during construction, works will cease immediately, and the project herpetologist will be contacted.

It is usual practice after a salvage operation to remove the habitat or to fence it off in order to prevent lizards from adjacent areas colonising. At the completion of the clearance of lizard habitat areas shown on **Figures 11** to **13**, the project herpetologist will inspect the area to ensure no viable potential lizard habitat remains. If the area cannot be sufficiently cleared of ground debris and potential habitat for ground-dwelling lizards, and there is a risk of lizards colonising the area, a lizard-proof fence will be installed along all areas of adjacent habitat to prevent colonisation.

8.5 Lizard Handling and Processing

The relocation will be undertaken in the most appropriate way to minimise stress on lizards. In order to ensure the welfare of animals during relocation and to maximise the chance of a successful relocation outcome; all staff will be suitably trained and experienced in the capture, handling, holding and release techniques that will be used. Lizard handling will be kept to a minimum and will only be carried out by trained and experienced staff. Handling will be limited to capture, morphometric measurement, and photography.

Captured lizards will be relocated to the identified release sites and will be released as soon as practicable into the release site (within 2 hours). Lizards will be released directly into enhanced habitat (e.g. log stacks created by felled wilding pines).

Lizards will be held individually in breathable cloth bags and temporarily stored in ventilated, hard-sided terrariums (to prevent accidental crushing). Terrariums will be placed in secure, shaded locations (ideally where the internal temperature is kept below 10°C) until they can be transported to the release site.

8.6 Data collection

The following data will be recorded on pre-prepared field datasheets:

- Species of lizard;
- Date of capture;
- Capture technique;
- Age class (adult, sub-adult, juvenile);
- GPS coordinates of capture site.

9.0 Lizard Release Site

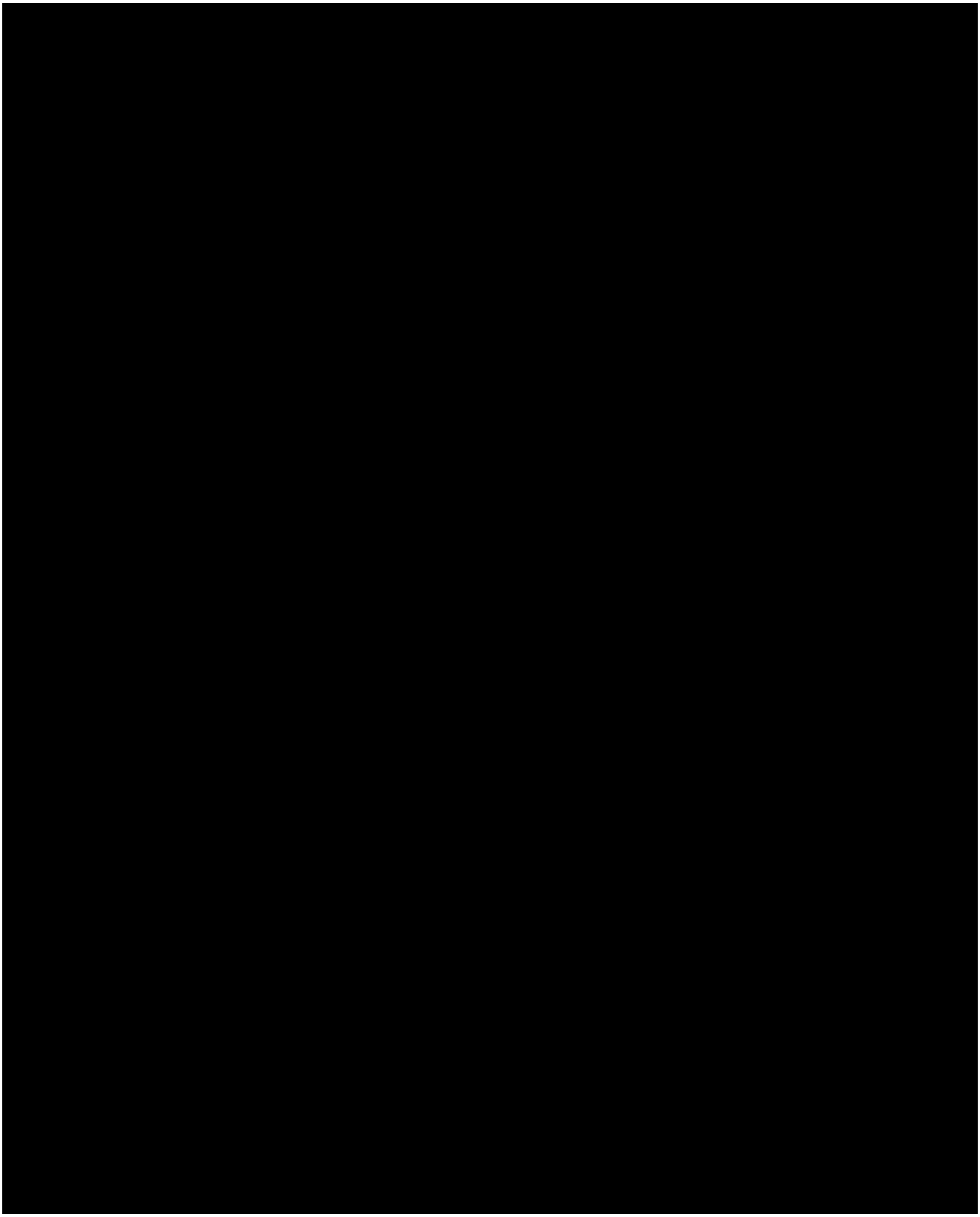

Figure 17. "Scrappy Pines Block" (red line), 4 ha predator control area (yellow)

9.1 Site Selection and Suitability

A range of factors need to be considered for the suitability of a release site, including:

- The site must be ecologically appropriate and suited to the species being salvaged.
- Have long-term protection and be suitable through time for the lizard species being salvaged.
- It must provide protection from predators.

The release site for all lizards is the 59.2 ha of high-quality habitat within the "Scrappy Pines Block" QEII Open Space Covenant.

McCann's skink and tussock skink are the primary focus for this LMP, and when assessing the potential for a release site to support populations of these species, the following considerations were made:

- Vegetation type and cover: McCann's skink and tussock skink prefer sunny areas of complex groundcover but also inhabit a wide range of other habitats including, wetlands, shrublands, rocky areas, and grassland. The release site includes a wide variety of micro-habitats and maintains consistency or is otherwise better than the development site with regards to vegetation cover, composition, size, and aspect.
- Proximity to water or potential for soil to maintain reasonable moisture levels: Lizards require areas with consistent year-round moisture levels. The snow tussock grassland within the release site is dense and the groundcover is protected such that there are areas with some level of protection from wind/ sun that support less drying of the soil layer and maintain sufficient moisture for lizards and there a numerous wetlands.
- Aspect: The release site is relatively flat along the top and the lower gullies are north facing has sufficient exposure to the sun throughout the day.
- Access to site: Ease of access to each site was considered an important criterion. The less time that lizards are held in transportation containers and the ease of transfer to the new site can have direct bearing on the mortality of the species, as the less time in transit means less chance of death from high levels of stress. Preference was given to a release site that is nearby and could be accessed by vehicle or with a short walk from a vehicle.
- Habitat complexity: It is preferable to have dense, thick, tall and complex ground cover and vegetation, rather than open, sparse and short vegetation. The release site is replete with dense, complex habitat.
- Surrounding landscape: The wider links to nearby suitable habitat to allow for population growth and secondary spread was considered, including identifying a release site with adjoining suitable habitat.
- Predator control: The release site will have 4ha of predator control for 3 years following release of lizards.

Table 11. Release site suitability summary

Suitability Factor	Release site description
Suitability of existing habitat	This area includes recently retired snow tussock grassland habitat which provides ample suitable habitat for McCann's skink and tussock skink.
Proximity of the site from the salvage	The proposed release site is c. 3.5 km from the furthest salvage site.
Long-term protection of the site	The release site is protected in perpetuity by a QEII Covenant
Accessibility for release	Has a nearby vehicle and walking tracks to allow for easy access when releasing lizards and monitoring.
Size of the release site and its connectivity to other habitat	The release site is 59.2 ha and is 1.6 times as large as the site being impacted.
Existing lizard populations	The existing lizard populations are in low abundance. A total of four lizards (3 tussock skink, one unidentified) were recorded from 4 clusters of 10 ACOs, checked twice. A CPUE of 5%.
Habitat enhancement opportunities	Hectares of woody debris has been created through felling wilding pines. Over the past 15 years regenerating snow tussock grassland has created hectares of high-quality habitat.
Existing predator control or opportunities to enhance predator control	A comprehensive mammalian predator control program will be undertaken across the Stage 2 site targeting hedgehogs, mustelids and feral cats, and inadvertently rats (Boffa Miskell 2025). This program will be supplemented with an intensive rodent (rats and mice) control program across 4 ha of the release site.

9.2 Predator Control

The purpose of the pest control programme is primarily to assist in the survival of relocated lizards, not specifically to increase the abundance of any existing lizard populations.

Predator control over the Stage 2 site will include a variety of methods to a level no greater than 10% residual trap interference (**Figure 18**). This predator control will be supplemented by using toxic baits applied in bait stations at 25 m spacings over 4 ha to target rodents (rats and mice) (**Figure 17**). Toxins rely on the target species ingesting bait as a food source eliciting a feeding response that results in death. Because of this, interaction rates tend to be higher with toxins than with traps.

Using a toxin that is safe, effective, and will not bioaccumulate in the environment thus endangering non-target species, is key to the execution of a successful toxin operation. It is recommended that a first-generation anticoagulant such as diphacinone or pindone is used. These toxins have a short life so they do not bioaccumulate and are ideal for targeting rodents.

Rodents, particularly rats, are known to remove toxic baits from bait stations and cache these which can result in non-target species being exposed to these baits when removed from bait stations. Potential solutions to reduce this risk involve wiring pellet baits into bait stations or the use of bait station designs that make this caching behaviour difficult, e.g. the pied piper bait station. The pied piper bait station is a run through station with small openings in the underside of the tunnel roof that require rodents to access and eat bait through a grided bait basket (**Figure 19**). It is recommended that the toxic baits are delivered in pellet form in pied piper bait stations (or similar) to minimise the risk to non-target animals from toxic baits being removed from bait stations during toxic control operations.

Pest control will be undertaken for two months prior to lizards being released and for three years after the final year of lizards being released. Traps will be checked and reset as per the recommendation of a qualified animal control expert to maintain low levels of predator numbers (e.g., <10% tracking rates for rodents).

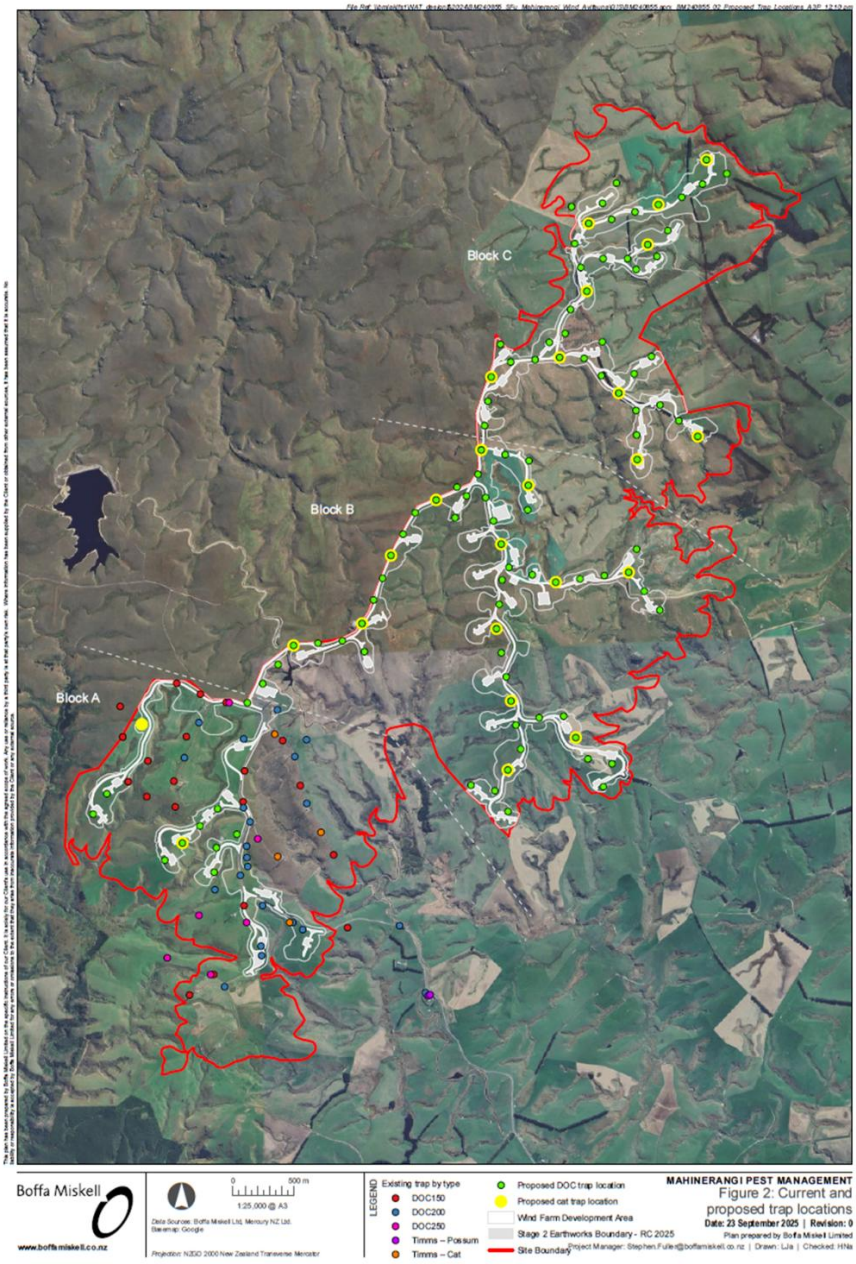

Figure 18. The proposed trap locations across the site. Figure courtesy of Boffa Miskell Limited.

Figure 19. The Pied Piper bait station, rodents cannot remove baits and are forced to eat bait within the stations.

9.3 Post-Release Monitoring

The overall goal of the lizard translocation is to establish a permanent and self-sustaining population at the release site. Post-release monitoring will therefore focus on relative population abundance, density, and dispersal.

To determine whether the lizard relocation is successful a robust post-release monitoring programme will be undertaken at the release site over three years.

The objective of the post-release monitoring is to test whether a permanent and self-sustaining McCann's skink and tussock skink population be established in areas retired from grazing, undertaking a short-term pest control programme to aid establishment, and development of natural retreats from felled wilding pines.

The availability of suitable habitat and the enhancement measures already undertaken will enable sufficient resources for lizards to establish and become self-sustaining. This is to be confirmed by the proposed post-release monitoring.

Post-release monitoring will not include the long-term tracking of individual skinks due to constraints with these species having indistinguishable visual features as well as ethical restrictions with permanent marking (e.g., toe-clipping skinks). Instead, population survivorship and secondary spread, will be monitored via detection rates of skinks recorded in an ACO network.

The monitoring program will be undertaken as follows:

- Deploying 50 triple-stacked ACO's in a 10 x 10 m grid. ACO's will be left for four weeks, and then checked once during suitable conditions (see section 8.2). ACO's locations will be marked with a stake to aid in repeat measures. ACO's will 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.

The following data will be recorded on pre-prepared field datasheets:

- Date and time of monitoring;
- Weather conditions (wind, overhead conditions) and ambient air temprature at the start and finish of the survey;

- Species of lizard;
- Monitoring device where captured individuals are recorded; and
- Presence of lizards observed but not captured.

10.0 Roles and Responsibilities

Project implementation, project management and performance monitoring will be managed internally by TWP with fieldwork delivered mainly by the project herpetologist. Details of roles and responsibilities associated with this management plan are provided in **Table 12.**

Table 12. Roles and responsibilities associated with this LMP.

Position	Accountable Task
TWP (Wildlife Approval Holder)	• Provide adequate resources for the implementation of this Plan and ensure it is implemented in accordance with Wildlife Approval requirements; • Report the results of the works to DOC in accordance with the monitoring and reporting requirements of this Plan; • Organise annual work programme as described in the relevant parts of this Plan; • Facilitate any monitoring required as part of this Plan; • Ensure the instruction of workers, implementation and overseeing of the requirements of this Plan, including monitoring the effectiveness of the methods set out in this Plan; • Ensure monitoring is conducted, recorded and communicated as per the requirements of this plan
Blueprint Ecology Ltd (Project herpetologist)	• Provide technical advice, including on-site assistance (e.g., lizard salvage, monitoring, and technical reporting) as required by this Plan and by TWP

11.0 Reporting

Following all lizard salvage activities, a compliance report will be prepared which includes details of all individual lizards salvaged and transferred to the release site. This compliance report will be made available to DOC by 30 June following the lizard salvage. The report will detail:

- Locations searched or trapped;
- The number of lizards salvaged and where they were released;
- Data collected as described in Section 8.6; and
- ARDS card provided to DOC.

A monitoring report will be prepared at the end of the post-release monitoring program and be made available to DOC by 30 June. The monitoring report will assess survivorship via population abundance.

12.0 Credentials and Permitting

This LMP has been prepared by Tony Payne, who is an expert herpetologist.

The herpetologist managing the implementation of this LMP is Tony Payne.

All lizard salvage work will be undertaken in accordance with a Wildlife Approval.

Mr Payne has many years salvaging lizards, and his credentials are provided below.

Tony Payne – Principal Ecologist, Blueprint Ecology Ltd: Tony is a Principal Ecologist and is a Certified Environmental Practitioner (Environmental Institute of Australia and New Zealand). He has ten years commercial experience surveying and salvaging lizards in NZ.

- Qualifications: BSc (Hons) (Biological Sciences) University of Canterbury.
- Affiliations/ membership; EIANZ, SRARNZ, Nelson Botanical Society
- Current employment: Principal Ecologist at Blueprint Ecology Ltd

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.

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Report prepared by:

Tony Payne

Principal Ecologist

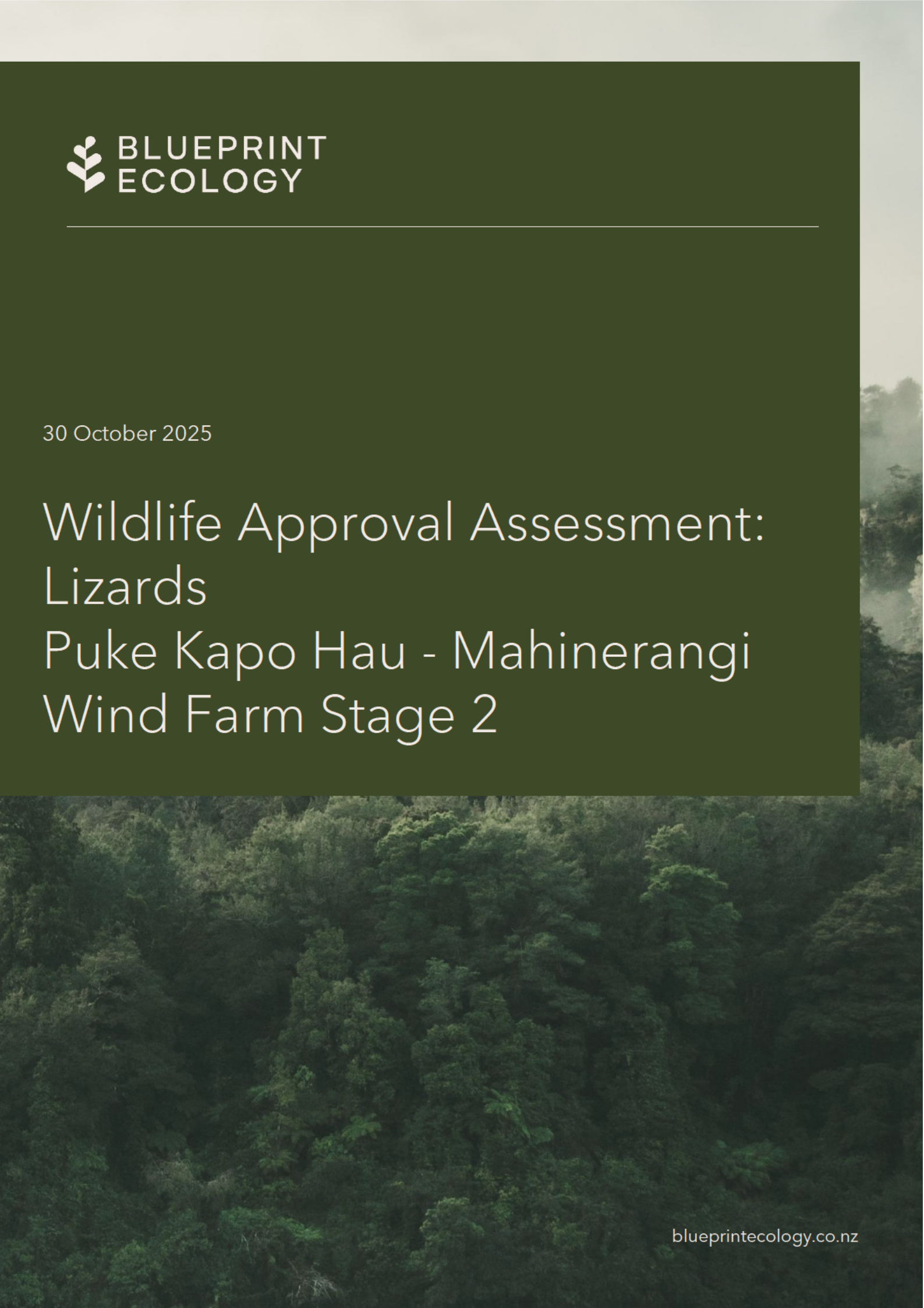
Blueprint Ecology Ltd

Appendix C: Wildlife Approvals Assessment

BLUEPRINT ECOLOGY

30 October 2025

Wildlife Approval Assessment: Lizards
Puke Kapo Hau - Mahinerangi Wind Farm Stage 2



blueprintecology.co.nz

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Blueprint Ecology Limited

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Version date:	30 October 2025
Version Status:	Final

CITATION:

Blueprint Ecology Limited. 30 October 2025. Wildlife Approval Assessment: lizards. Puke Kapo Hau - Mahinerangi Wind Farm Stage 2. Report prepared for SLR Consulting New Zealand Limited. 17 pages

BLUEPRINT ECOLOGY

Contents

Introduction

Tararua Wind Power Limited (TWP), a fully owned subsidiary of Mercury NZ Limited, is progressing Stage 2 of the Mahinerangi Wind Farm (MWF) known as Puke Kapo Hau (**Figure 1**). The consented site area of the Mahinerangi Wind Farm Site is approximately 1,723 ha and is located on the eastern foothills of the Lammermoor Range at approximately 600m and 730 m elevation, situated approximately 5 km north of Lake Mahinerangi and approximately 50 km west of Dunedin. The west and north-western boundary of the MWF is bounded by the Te Papanui Conservation Park and Black Rock Scientific Reserve. The MWF is situated within a predominately pastoral setting that has a backdrop of lesser developed land at the Lammermoor Range.

Blueprint Ecology Ltd were engaged to provide specialist ecological advice with respect to the management of lizards to avoid, minimise or remedy and if possible and appropriate, offset or compensate more than minor residual impacts. A Lizard Assessment (Blueprint Ecology Ltd 2025) of actual and potential impacts to lizards associated with the development was prepared which includes detailed descriptions of lizard values and habitat types present within the Stage 2 Windfarm Development Area and transmission corridor. That report should be read in conjunction with this Wildlife Approval Assessment.

A survey of lizard populations across all potential habitat types within and surrounding the Stage 2 Windfarm Development Area was undertaken in March and April 2025. The survey confirmed Not threatened McCann's skink (*Oligosoma maccanni*) and At Risk tussock skink (*Oligosoma chionochloescens*) within snow tussock grassland, rough pasture, wetlands, plantation forest and rock habitats within the proposed Stage 2 Windfarm Development Area and transmission corridor.

All native lizards are protected under the Wildlife Act 1953. The Fast-track Approvals Act 2024 (FTAA) provides for Wildlife Approvals which are an authority for an act or omission that would otherwise be an offence against specified provisions of the Wildlife Act 1953 including where native lizards may be harmed or killed during the course of a site's development.

A Wildlife Approval may grant permission to relocate native lizards, and the killing or injury of lizards not caught or relocated from a site.

The purpose of this assessment is to address each Wildlife Approval matter contained in clauses 2 and 5 of Schedule 7 of the FTAA. The Wildlife Approval matters clause 2(1)(a) – (o) are presented in italics in the following sections, followed by our assessment.

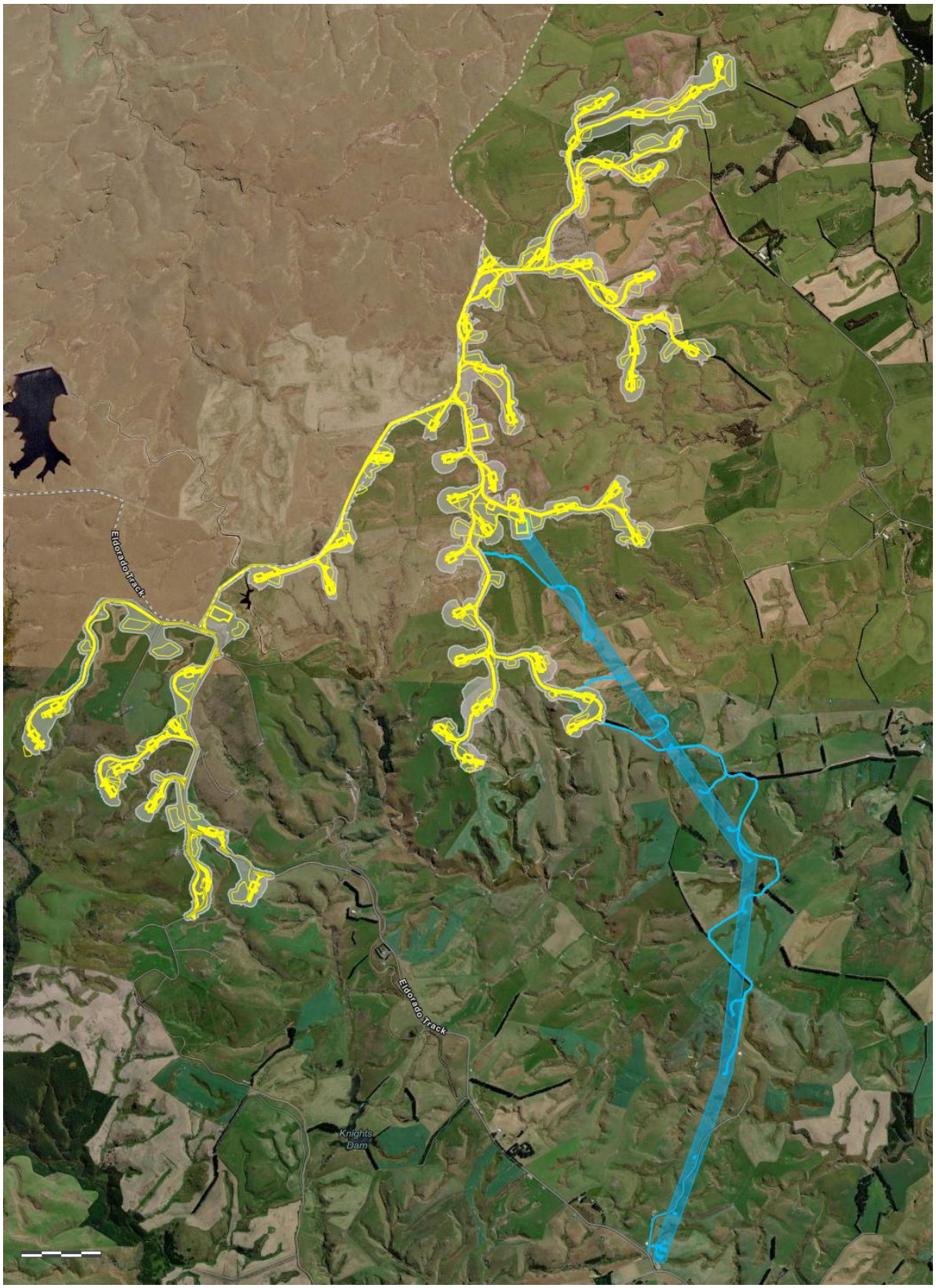

Figure 1. Mahinerangi Stage 2 layout (yellow), Windfarm Development Area (grey), Transmission Line Corridor and access tracks (blue).

Matter 1 – clause 2(1)(a)

a) specify the purpose of the proposed activity.

The purpose of the proposed activity is to protect native lizard species by avoiding and minimising the injury or death to native lizards associated with vegetation clearance and earthworks undertaken for the development of Stage 2 Mahinerangi Wind Farm.

Matter 2 – clause 2(1)(b)

(b) identify the actions the applicant wishes to carry out involving protected wildlife and where they will be carried out (whether on or off public conservation land).

TWP seeks to capture, handle and relocate native lizard species from areas of high and moderate habitat quality totalling c. 12.6 ha within the Stage 2 MWF Windfarm Development Area and Transmission Corridor layout (**Figure** 2) to a 59.2 ha area of high-quality habitat that is protected in perpetuity referred to as the "Scrappy Pines Block" QEII Covenant area (**Figure 3**). The Stage 2 Mahinerangi Wind Farm Development Area, Transmission Corridor footprint and "Scrappy Pines Block" QEII Covenant area are on private land.

TWP also seeks to kill wildlife incidentally during construction activities after all reasonable steps to avoid, minimise, and compensate adverse effects to native lizards.

Figure 2. Medium-quality lizard habitat (orange) and high-quality lizard habitat (red) and the indicative numbers of artificial cover objects (ACOs) to be used for the lizard salvage. Mahinerangi Stage 2 layout (yellow). Contingency Zone (white).

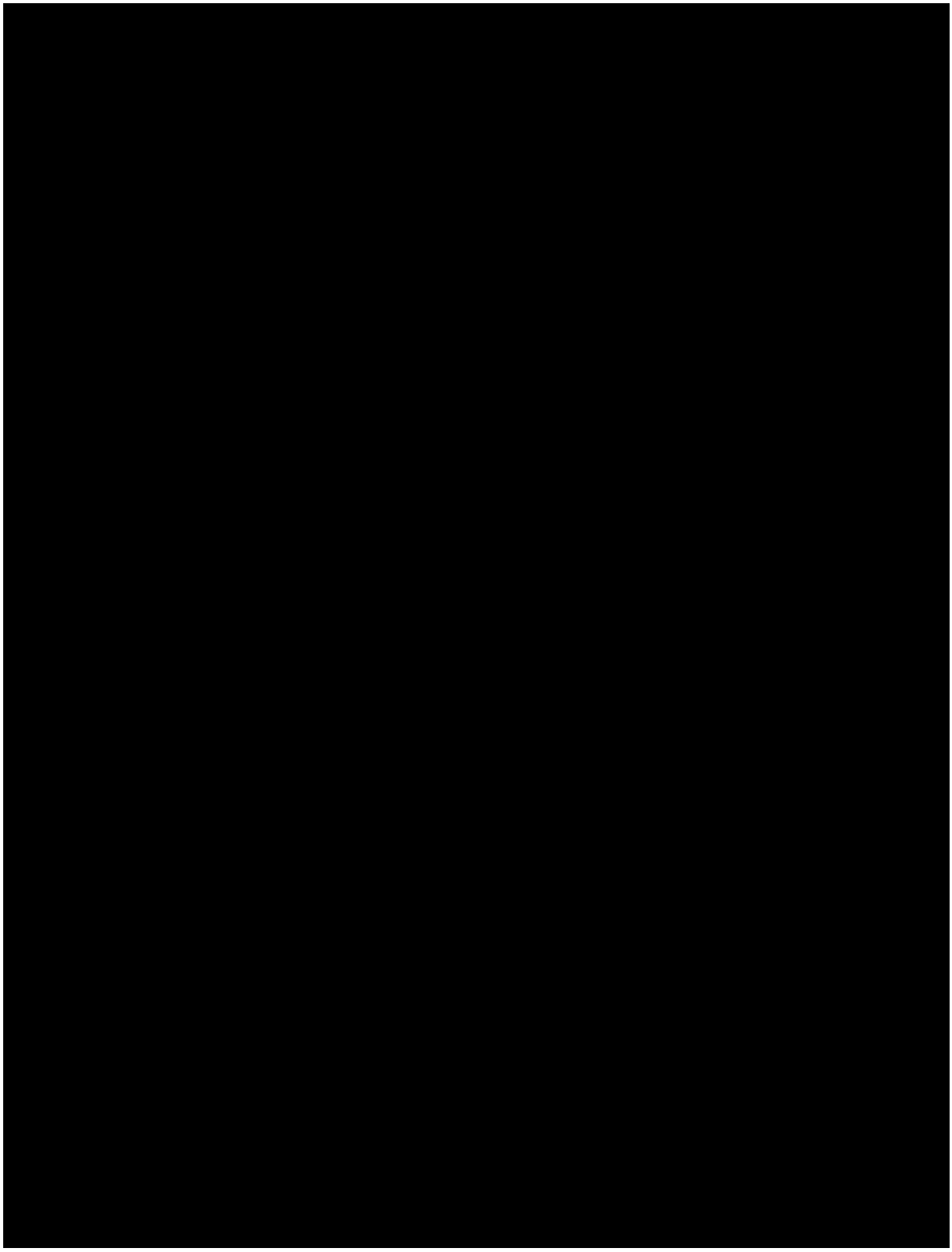

Figure 3.

Matter 3 – clause 2(1)(c)

(c) include an assessment of the activity and its impacts against the purpose of the Wildlife Act 1953.

The principal purpose of the Wildlife Act 1953 ("Wildlife Act") has been described by the Supreme Court as the protection of wild animals. Recent amendments to the Wildlife Act provide that a section 53 Wildlife Act authority that authorises the killing of wildlife that is incidental to carrying out an otherwise lawful activity may be granted. The authority is to be treated as consistent with the protection of wildlife if, in granting it, the Director-General is satisfied that its overall effect would be consistent with the protection of—

a) populations of wildlife; and
b) individual wildlife.

The recent amendments to the Wildlife Act, including their application to Stage 2 of the Mahinerangi Wind Farm are discussed further in the Legal Submissions on behalf of TWP.

The activities subject to the wildlife approval are consistent with the protective purpose of the Wildlife Act, as protection of lizards is achieved through:

- avoiding the majority of potential lizard habitats within the Mahinerangi Wind farm Site;
- capturing and relocating lizards prior to bulk earth working and vegetation removal activities;
- pest control at selected sites within QE II Scrappy Pines Block.

Impacts include the clearance of vegetation on site which has the potential to disturb, injure and/ or kill native lizards. Native lizards have been confirmed within c. 35 ha (c.12.6 ha of which is high and moderate habitat quality) of snow tussock grassland, rough pasture, wetlands, plantation forest and rock habitats within the Stage 2 indicative windfarm layout and wider turbine Contingency Zones.

Approximately 75% of the Stage 2 MWF layout and 98% of the Transmission Corridor layout include exotic pasture and/ or cropping areas which provide no habitat for lizards. The layout avoids the best habitats for lizards that have been consented for development, including the "Thomas Block" and "Scrappy Pines Block" QEII Covenant. TWP has advised that the current Stage 2 MWF layout and Transmission Corridor encompass all areas and values for lizards that can be avoided to the extent feasible.

After all avoidance measures have been applied, to minimise potential adverse effects to lizards during construction, a Lizard Management Plan (LMP) has been prepared following good practice guidance (DOC 2019)[1]. In summary, the LMP includes:

- Deploying a minimum of 600 artificial cover objects (ACOs) within the best habitats for lizards and checking these a minimum of five times (3,000 checks) and relocating lizards to the "Scrappy Pines Block" QEII covenant area;
- Salvaging lizards from rock outcrops;
- Outcrops impacted by works without resident lizards will be removed and reset, right way up, adjacent to the track margin, and where possible, reset in ways to provide some lizard habitat; and

[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

- Installing lizard-proof fencing along the interfaces of development and of suitable lizard habitat, where relevant.
- Undertaking 4 ha of predator control at the release site for 3 years.

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 wind farm will be Negligible.

To result in a no-net-loss in values for lizards, and in this instance a net-gain, the loss of c. 22.3 ha of low quality, c. 12.5 ha of moderate quality, and 1,285 m2 of high-quality habitat, has been redressed in advance by TWP by creating a 59.2 ha of high-quality habitat within the "Scrappy Pines Block" QEII Open Space Covenant.

Over the past 15 years, management within this area has included the clearance of hectares of wilding pines, and retirement of grazed pasture which has subsequently developed into indigenous vegetation dominated by dense snow tussock grassland (*Chionochloa rigida*) and golden Spaniard (*Aciphylla aurea*). Overall, this provides excellent habitat for lizards and offsets the effects of the loss of habitat at a 1.6:1 ratio such that there is a long-term positive effect with regards to lizard habitat values.

An additional benefit of the regeneration of indigenous vegetation and all the woody debris is that this has created many hectares of additional high-quality lizard habitat, which means that there are sufficient resources for relocated lizards and consequently the carrying capacity of the site is expected to be very high and much greater than the existing population levels. This means that there is sufficient resources for relocated lizards avoiding any potential carrying capacity issues. In addition to the increase in suitable habitat, ongoing predator control has been undertaken in this area by TWP over the past 15 years, and it has been demonstrated that a significant increase in lizard numbers can be achieved in areas subject to intensive mammalian predator control (Reardon et al., 2012; Norbury et al., 2022).

Further to the "Scrappy Pines Block", TWP is also creating a 4.6 ha compensation site to redress effects to natural wetland. This area will be protected for the life of the wind farm, and over time the c. 2.3 ha of terrestrial riparian margins will provide further high-quality habitat for lizards.

Following the implementation of the Lizard Management Plan, the actual and potential adverse effects of the activity on native lizards will be positive through an increase in extent and quality of lizard habitats that will be protected which is consistent with the purpose of the Wildlife Act 1953.

Matter 4 – clause 2(1)(d)

(d) list protected wildlife species known or predicted to be in the area and, where possible, the numbers of wildlife present and numbers likely to be impacted.

The species known and predicted to be in the c. 35 ha impact area are Not threatened McCann's skink and At Risk tussock skink.

Based on pre-development surveys measuring the relative abundance of lizards within and surrounding the Stage 2 MWF layout, it is estimated that 4,000 to 5,000 lizards are present within the Stage 2 MWF layout.

The proposed lizard salvage method includes 600 ACOs and checking these a minimum of 5 times (3,000 checks). It is estimated that between 2,000 to 4,000 lizards will be salvaged. It is estimated that the number

of McCann's skink likely to be impacted is between 500 to 1,000 animals and the number of tussock skink is 100 to 300 animals.

Given the activity has protected and enhanced 59.2 ha of lizard habitat for the past 15 years, we estimate that the local population of McCann's and tussock skink has increased such that it would greatly exceed the number of native lizards covenant as part of the activity and continue to increase over the long-term.

Matter 5 – clause 2(1)(e)

(e) outline impacts on threatened, data deficient, and at-risk wildlife species (as defined in the New Zealand Threat Classification System).

There are direct impacts to At Risk tussock skink associated with the construction activities. These impacts will be minimised and compensated as per the above sections such that there is a positive effect to this species.

The likelihood of the presence of any other native lizard species classified as At Risk or Threatened occurring within the Windfarm Development Area is very low or low.

There are no lizard species classified as data deficient applicable to this project. A detailed description of each lizard species classified as At Risk or Threatened is provided in the following sections.

Kōrero gecko

Kōrero gecko have experienced declines in Otago over the last 30-years; a once common gecko species is now becoming harder to find (M. Tocher pers. obs). Kōrero geckos were detected in the 2006 ecological assessment that informed Stage 1 of the MWF (Kingett Mitchell Ltd 2006) where they were described as "relatively common on rocky tors and outcrops." In terms of habitats, Kingett Mitchell Ltd 2006 state that "geckos were not observed within tussock or pastoral grassland areas" but do not specifically exclude them from rocky tors and outcrops in these habitats. The 2006 survey did not provide georeferenced locations of kōrero gecko, or indeed any lizard species, meaning the 'commonness' of kōrero geckos cannot be fully ascertained over the MWF site. The schist over the MWF site is "undifferentiated Caples Terrane TZIII schist"[2] which is known for its quartz veins and minimal foliation making it blocky and substandard as lizard habitat compared to other schist in Otago (e.g., around Alexandra). For this report, therefore, the likelihood of kōrero geckos being present over the MWF site has been assessed as "Low" given the lack of records nearby and the quality of rock habitats present.

Jewelled gecko

Jewelled geckos, an arboreal (tree-dwelling) gecko, are thought to be once relatively common in the vicinity of Lake Mahinerangi (Whitaker et al. 2002) and were found at Black Rock within 3 km of the site. They are

[2] https://data.gns.cri.nz/geology/

also known from Lammerlaw Stream catchment (Carter 1994) and Nardoo Scenic Reserve immediately to the west of the Stage 2 project area (Ward and Munro 1989).

No jewelled geckos were found over the MWF site during the 2006 survey that included a night search of shrubby areas north of Black Rock Scientific Reserve (Kingett Mitchell Ltd 2006). Based on habitats present and the degree of modification/removal of shrublands over the MWF site, the likelihood of jewelled geckos being present over the MWF site has been assessed as "Low".

Burgan skink

Burgan skinks have only recently been described (Chapple *et al*. 2011) and are currently considered an alpine specialist. Recent survey work has expanded their known distribution over the Otago uplands, but all records occur in areas of dense vegetation at altitudes above 700 m asl. (Wildlands 2019, 2020, 2021 and 2022; M. Tocher pers. obs.). The likelihood of Burgan skinks being present over the MWF site, that takes in altitudes not known to support Burgan skinks, has been assessed as "Very low".

Herbfield skink

Herbfield skinks (Jewell 2022) were once known as cryptic skinks over large swathes of Otago including areas adjacent to the MWF site (e.g., near the Waipori dam; Tony Jewell pers. comm., May 2025). It is possible that records of both tussock skink and McCann's skink have been confused for herbfield skink by inexperienced observers as they can look very similar. Herbfield skinks usually inhabit damp, densely vegetated microsites in grassland, indigenous herb fields and open shrublands. The presence of herbfield skinks over the MWF site has not been confirmed, despite reference to cryptic skinks being recorded "locally around the MWF site" in the 2006 ecological assessment that informed Stage 1 of the MWF (Kingett Mitchell Ltd 2006). Notably, surveys by a team of experienced herpetologists failed to detect herbfield skinks over the MWF site in 1987 (Whitaker 1987) which is consistent with a description of the distribution of the species as "patchy and localised" (Whitaker 2002). Based on habitats present, herbfield skinks have been assessed as having a 'Very low' likelihood of being present over the MWF site.

Otago green skink

Otago green skinks are large-bodied skinks that require dense vegetation and rock to survive in a predator-loaded environment such as MWF site (Tocher 2006). No records for Otago green skink were found in the DOC herpetofauna database for the MWF site or nearby areas, and Otago green skinks were not detected over the 2006 lizard survey that informed Stage 1 of the MWF (Kingett Mitchell Ltd 2006) or in a 2021 survey to inform the Lake Onslow Battery Project (Konlechner et al. 2022), noting this survey concentrated effort about 700 m asl. Well outside the MWF site, a green skink was found in 2009 along the Teviot River South Branch (c. 25 km west from the centre of the MWF site; Konlechner et al. 2022). A 1987 lizard survey of the area also failed to detect green skinks south of Sutton Stream despite suitable habitat occurring elsewhere (Whitaker 1987). For this report therefore, and based on habitats present, Otago green skinks have been assessed as having a 'Very low' likelihood of being present over the MWF site.

Grand skink

The 2006 lizard survey to inform Stage 1 MWF found a mummified grand skink c. 4 km north of the Stage 2 MWF layout (Kingett Mitchell Ltd 2006). Grand skinks are known from multiple rocky sites north of the Stage 2 MWF layout but are considered locally extinct (Whitaker 1987; latest recovery plan). Indeed, mummified remains of grand skinks have been found at Macraes Flat over areas where skinks have not been seen for many decades (M. Tocher pers. obs). Moreover, the low foliation characteristics of the schist over the MWF

site is not conducive to the long-term persistence of grand skinks. In our opinion, grand skinks are locally extinct and there is no likelihood of being present over the MWF site.

Matter 6 – clause 2(1)(f)

(f) state how the methods proposed to be used to conduct the actions specified under clause 2(1)(b) will ensure that best practice standards are met

The Department of Conservation has prepared a "best practice" guidance document (DOC 2019) which describes nine principles that should be adhered to when applying for a Wildlife Act Authority for a lizard salvage and transfer resulting from a proposed development project (DOC's principles). It covers the practice of lizard salvage and transfer and addresses the entire process including:

1. Assessments of the impacts of proposed developments on lizards and exploration of alternatives (e.g. avoidance of lizard habitat).

2. Planning of salvage operations and assessment and approval of these proposals from the appropriate authorities.

3. Preparing habitat at release sites, capturing lizards at impact sites, temporary captivity (if required), data collection, transport to and release at receiving sites.

4. Post-release monitoring, contingency implementation as appropriate, and reporting to DOC (and/or other consent authorities).

A summary of the nine principles and how these matters have been addressed is provided in **Table 1**.

Table 1. Assessment of DOC's Nine Principles for Lizard Salvage.

Principle for Lizard Salvage	Summary of Assessment of Principle
1. Lizard species' values and site significance must be assessed at both the impact (development) and receiving sites.	Lizard species' values, and site significance has been assessed based on a desktop assessment of the herpetofauna database, a site survey of available habitats via manual habitat searching and visual encounter surveys, and survey devices (Artificial Cover Object (ACO), Gee's minnow traps). The significance of the habitat at the impact and receiving site for lizards has been assessed based on the size, quality, species diversity and abundance.
2. Actual and potential development-related effects and their significance must be assessed.	The actual and potential development related effects and their significance have been assessed based on 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). For lizard species and habitat, the overall ecological effect after managing effects has been applied is positive (a net increase in lizards and net increase in the size and quality of habitat of 24.2 ha).
3. Alternatives to moving lizards must be considered.	Stage 2 has reduced the consented number of turbines to 44 and avoided the principal high value lizard habitat within the consented layout being the Thomas Block and the QEII block. It is understood that the proposed layout encompasses all areas and values for lizards that can be avoided to the extent practicable.

Principle for Lizard Salvage	Summary of Assessment of Principle
	Avoidance and remediation measures cannot result in no-net-loss of lizards from the development area. Compensation is proposed to achieve a net-gain in lizard values. There are no alternatives to moving lizards.
4. Threatened lizard species require more careful consideration than less-threatened species.	No lizard species listed as Threatened (Hitchmough et al. 2021) are likely to inhabit the development footprint. No Threatened lizard species are applicable to this activity.
5. Lizard salvage, transfer and release must use the best available methodology.	The lizard salvage includes the best available methodologies. This includes an extensive grid of ACO covers at 5-10 m spacings within suitable habitats for lizards, with a total of 600 devices. The effort allocated to lizard salvage will include a minimum of five checks (3,000 device checks). The transfer of lizards will be undertaken in the most appropriate way to minimise stress on lizards (see response to Matter 7). Captured lizards will be relocated the same day as capture to a pre-identified release site and released directly into areas that provide immediate protection from predators (e.g., woody debris).
6. Receiving sites and their carrying capacities must be suitable in the long term.	The receiving site is 1.6 times larger than the impact area with higher quality habitat for the relevant species. The release site includes hectares of woody debris from clearing wilding pines, and many hectares of snow-tussock grassland that has reverted from grazed pasture. These conditions will allow for population growth and secondary spread and provide suitable habitat resources to cater for the carrying capacity in the long-term for all species of lizard proposed to be salvaged.
7. Monitoring is required to evaluate the salvage operation.	Post-release monitoring will be undertaken annually for 3 years following lizard salvage.
8. Reporting is required to communicate outcomes of salvage operations and facilitate process improvements.	Reporting of the outcomes of the lizard salvage and post-release monitoring results will be provided to DOC for 3 years.
9. Contingency actions are required when lizard salvage and transfer activities fail.	A further 2.3 ha of lizard habitat will be created and protected as part of compensating effects to natural wetlands. This provides a contingency for habitat creation, where a separate area for lizards will be established in the instance that there are unforeseen effects/ disturbance at the release site (e.g., fire). The lizard salvage and transfer follow a standard methodology, and no contingency actions are proposed nor appropriate / required for this activity. For species unlikely to occur on site, the release site includes all the necessary habitat requirements.

Matter 7 – clause 2(1)(g)

(g) describe the methods to be used to safely, efficiently, and humanely catch, hold, or kill the animals and identify relevant animal ethics processes.

The relocation will be undertaken in the most appropriate way to minimise stress on lizards. In order to ensure the welfare of animals during relocation and to maximise the chance of a successful relocation outcome; all staff will be suitably trained and experienced in the capture, handling, holding and release techniques that will be used. Lizard handling will be kept to a minimum and will only be carried out by trained and experienced staff. Handling will be limited to capture, morphometric measurement, and photography.

Captured lizards will be relocated to the identified release sites and will be released as soon as practicable into the release site (within 1-2 hours). Lizards will be released directly into enhanced habitats (e.g. log piles).

Lizards will be held in individual breathable cloth bags. Each cloth bay with have a small amount of damp grass from the capture site and a wetted sponge will be placed inside with the lizards to prevent dehydration. All lizards within cloth bags will be temporarily stored in ventilated, hard-sided terrariums (to prevent accidental crushing). Terrariums will be placed in secure, shaded locations (ideally where the internal temperature is kept below 10°C) until they can be transported to the release site.

Matter 8 – clause 2(1)(h)

(h) state the location or locations in which the activity will be carried out, including a map (and GPS co-ordinates if available).

TWP seeks to capture and handle native lizard species from areas of high and moderate quality lizard habitat (**Figure 2**) and relocate them to the "Scrappy Pines Block" QEII Covenant area (**Figure 3**). The full Stage 2 MWF layout and wider development area is shown on **Figure 1**.

Matter 9 – clause 2(1)(i)

(i) state whether authorisation is sought to temporarily hold or relocate wildlife.

An authorisation is sought to only relocate wildlife.

Matter 10 – clause 2(1)(j)

(j) list all actual and potential wildlife effects (adverse or positive) of the proposed activity, including effects on the target species, other indigenous species, and the ecosystems at the site

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 wind farm.

Positive effects include a net-gain of protected high quality lizard habitat of 24.2 ha.

Effects on other indigenous species and ecosystems at the site include:

- Approximately 476 m2 (0.05 ha) of natural wetland will be cleared. This loss will be compensated for by rehabilitating nearby wetlands guided by a Wetland Compensation Plan such that a long-term positive effect will occur.
- Due to existing agricultural modifications, impacts on terrestrial invertebrates from the variations to the land use consent and new activities are expected to be minimal.

Matter 11 – clause 2(1)(k)

(k) where adverse effects are identified, state what methods will be used to avoid and minimise those effects, and any offsetting or compensation proposed to address unmitigated adverse effects (including steps taken before the project begins, such as surveying, salvaging, and relocating protected wildlife).

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 wind farm which will be minimised by relocating lizards prior to clearance works commencing. Compensation for the loss of habitat includes protecting and enhancing 59.2 ha of lizard habitat (increase of 1.6:1) in advance of the effect.

The protection and enhancement of the 59.2 ha Scrappy Pines block results in a net increase in extent of lizard habitat of 21.7 ha, as well as a net-gain in the condition (structure and quality) of habitat for lizards.

There is an exchange of almost exclusively low and medium quality habitats (e.g., fragmented rough pasture) at the impact site for a large contiguous area of high-quality habitats comprising snow-tussock grassland, golden spaniard mosaics, countless woody debris piles, indigenous wetland margins, and large rocky outcrops.

93% of the potential habitat loss has been compensated 15 years in advance of the effect. Therefore, there is no effective delay between loss of, or effects on, lizard values at the impact site. It is considered that the gain or maturity of lizard values at the Scrappy Pines Block have already accrued well and beyond the loss of values at the impact site.

These gains in lizard values are above and beyond what would have occurred in the absence of the compensation.

Matter 12 – clause 2(1)(l)

(l) state whether the applicant or any company director, trustee, partner, or anyone else involved with the application has been convicted of any offence under the Wildlife Act 1953.

It is understood that neither TWP, nor director, trustee, partner, or anyone else involved with the application has been convicted of any offence under the Wildlife Act 1953.

Matter 13 – clause 2(1)(m)

(m) state whether the applicant or any company director, trustee, partner, or anyone else involved with the application has any current criminal charges under the Wildlife Act 1953 pending before a court.

No.

Matter 14 – clause 2(1)(n)

(n) provide proof and details of all consultation, including with hapū or iwi, on the application specific to wildlife impacts.

TWP has been engaging with Te Rūnanga o Ōtākou since late 2024. This engagement has included project briefing hui where project overview information has been provided, specific environmental assessment and effects briefing hui, and the provision of all technical and management plan documents for review. Engagement is ongoing.

Matter 15 – clause 2(1)(o)

(o) provide any additional written expert views, advice, or opinions the applicant has obtained concerning their proposal.

None.

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Appendix D: 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).

D.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 D1** and **Table D2**)

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 D1. 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: • Typical structure and composition • Indigenous species dominate • Expected species and tiers are present • Thresholds may need to be lowered where all examples of a type are strongly modified Criteria for representative species and species assemblages: • Species assemblages that are typical of the habitat • Indigenous species that occur in most of the guilds expected for the habitat type
Rarity/Distinctiveness	Criteria for rare/distinctive vegetation and habitats: • Naturally uncommon, or induced scarcity • Amount of habitat or vegetation remaining • Distinctive ecological features • National priority for protection Criteria for rare/distinctive species or species assemblages: • Habitat supporting nationally Threatened or At Risk species, or locally uncommon species • Regional or national distribution limits of species or communities • Unusual species or assemblages • Endemism

Matter	Attributes to be Considered
Diversity and Pattern	• Level of natural diversity, abundance and distribution • Biodiversity reflecting underlying diversity • Biogeographical considerations – pattern, complexity • 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 • The essential characteristics that determine an ecosystem's integrity, form, functioning, and resilience (from "intrinsic value" as defined in RMA)

D.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 D3**.

Table D3. 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 D4**.

Table D4. 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

D.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 D5** below.

Table D5. 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 D3**, 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.

D.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.

D.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.

D.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.