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Glossary and Acronyms/terms

Acronym/Term	Description
Package 1 activity	Catch, handle and relocate lizards from habitat within the Package 1 Project area, authorised under 119946-FAU and as shown in Figure 1.1.
Package 2 activity	Catch, handle and relocate lizards from habitat within the Package 2 Project area, within the scope of this WA report and as shown in Figure 1.1. Catch and handle lizards for monitoring purposes in the relocation areas as shown in Appendix A Figure 1.
Project	State Highway 1 North Canterbury – Woodend Bypass Project (Belfast to Pegasus) (the construction, operation, and maintenance thereof).
Project area	Package 2 areas applicable to this Wildlife Approval (WA) report, which includes the following sections (as shown in Figure 1.1): <ul style="list-style-type: none"> • Cam River / Ruataniwha to Williams St. • Quarry Lakes – Woodened Beach Road. • Woodened Beach Road – Gladstone Road. • Gladstone Road – SH1. • Pegasus Interchange. • Lizard relocation areas/sites at Barkers Road and Kaiapoi Lakes Reserve.

Acronym/Term	Description
Designation	As the context requires: <ul style="list-style-type: none"> • Existing: The designation for the Project and State Highway 1 in an operative version of the Waimakariri District Plan. • Proposed: The existing designation inclusive of the alterations sought by the NZTA shown in Volume 2C (conditions) and Volume 4D (boundaries) of the SAR.
DOC	Department of Conservation
EclA	Ecological Impact Assessment
FTAA	Fast-track Approvals Act
km	Kilometre
LMP	Lizard Management Plan
m	Metre
NZTA	New Zealand Transport Agency Waka Kotahi
Project	State Highway 1 North Canterbury – Woodend Bypass Project (Belfast to Pegasus) (the construction, operation, and maintenance thereof)
SAR	Substantive Application Report
SH1	State Highway 1
WDC	Waimakariri District Council
Wildlands	Wildland Consultants Ltd, the contractor engaged by NZTA to undertake a lizard survey report for the Project area.
WAC	Wildlife Act Consent (WAC)
WA	Wildlife Approval

Executive Summary

Detailed ecological assessments of the Project site have been undertaken to inform the application under the Fast-track Approvals Act process (Wildlands, 2025a; Tonkin & Taylor Ltd (T+T), 2025). Surveys conclude that Canterbury grass skink (*Oligosoma* aff. *polychroma* Clade 4, At Risk-Declining) are present within the Project area. All indigenous lizards are protected under the Wildlife Act (1953), and appropriate management is therefore required.

An application for a Wildlife Approval is being sought for authorisation of the following:

- Catching and handling lizards.
- Lizard salvage and translocation.
- Incidental injury or mortality of lizards.
- Post-release monitoring of lizards.

The Project is split into two packages:

Package 1 (outside the scope of this report):

Initial works will be undertaken as an advanced package. A Wildlife Act Consent (**WAC**) under Section 71 of the Wildlife Act has been granted by DOC for these works (119946-FAU). **Package 2 (within scope of this report):**

The main construction works package are planned to begin in the 2026/27 construction season. Approval for these works is being sought through the Fast-track Approvals process. A comprehensive background and description of the works and associated activities is contained in the Substantive Application Report.

Up to 12.4 ha of low-moderate value vegetation has been identified as potential lizard habitat within the Project area for Package 2 and removal is required to facilitate the construction of the Project. Due to low mobility, lizards may not be able to disperse during site preparation and vegetation clearance works. Removal of potential habitat may result in displacement, stress, injury or incidental mortality of individuals.

Methods to safely catch, hold and relocate lizards prior to vegetation removal are proposed. The salvage and relocation methods are consistent with best-practice methodologies and are commonly used on land development and roading projects. The methodologies have been adapted for local site conditions and scaled to the low-moderate lizard habitat present.

Several potential relocation sites were identified and considered using a combination of reviewing aerial imagery and existing site knowledge in accordance with DOC's key principles for lizard salvage and transfer (2019). Two suitable relocation sites have been identified:

- Barkers Road relocation site (adjacent to the Project area).
- Kaiapoi Lakes Reserve relocation site (located ~400 m from the Project area).

Enhancement measures are proposed at the relocation sites including pest plant control, enhancement planting, provision of lizard habitat features/refugia and pest mammal control to increase carrying capacity and ensure greater likelihood of population persistence. Through the implementation of these measures, as well as incidental discovery protocols, it is considered that all reasonable measures will be applied to minimise adverse effects on indigenous lizards during the proposed salvage and relocation activity.

While this is not a matter before the Environment Court, the authors of this report have each read the Code of Conduct for Expert Witnesses contained in the Environment Court Practice Note 2023 ('Code'). The authors have each complied with the Code in the preparation of this report.

The data, information, facts and assumptions the authors have each considered as part of this report are set out in this report. The reasons for the conclusions of the report are also set out in this report. Unless stated otherwise, this report is within each of the authors' expertise and the authors have not omitted to consider material facts known to them that might alter or detract from the opinions expressed.

1 Introduction

1.1 Project overview

The New Zealand Transport Agency Waka Kotahi (**NZTA**) proposes to construct, operate, and maintain the *State Highway 1 North Canterbury – Woodend Bypass Project (Belfast to Pegasus)* (the **Project**).

The Project will extend the State Highway 1 (**SH1**) Christchurch Northern Corridor between Belfast and Pegasus and spans a linear length of approximately 11 kilometres (**km**), commencing from approximately 600 metres (**m**) south of the Kaiapoi River Bridge and ending approximately 700 m north of the Pegasus/Ravenwood intersection. The Project includes upgrades to approximately 4 km of the existing SH1 and a new approximately 7 km bypass of Woodend township.

For the purposes of the Wildlife Act 1953, the Project is split into two packages:

Package 1 (outside the scope of this report)

Initial works will be undertaken as an advanced package, which is being authorised through a standard process. A Wildlife Act Consent (**WAC**) under Section 71 of the Wildlife Act has been granted by DOC for these works (119946-FAU). Package 1 areas include:

- SH1 upgrades south the Cam River/Ruataniwha.
- Quarry Lakes.
- Garlick Street.

Package 2 (the scope of this report)

The main construction works package are planned to begin in the 2026/27 construction season. Approval for these works is being sought through the Fast-track Approvals (**FTAA**) process. A comprehensive background and description of the works and associated activities is contained in the Substantive Application Report (**SAR**).

The **Project area**¹ applicable to this Wildlife Approval (WA) report includes the following sections:

- Cam River / Ruataniwha to Williams St.
- Quarry Lakes – Woodend Beach Road.
- Woodend Beach Road – Gladstone Road.
- Gladstone Road – SH1.
- Pegasus Interchange.
- Lizard relocation areas at Barkers Road and Kaiapoi Lakes Reserve.

Figure 1.1 shows the Project area applicable to this Wildlife Approval (WA) report (Package 2). The locations of the lizard relocation areas (Barkers Road and Kaiapoi Lakes Reserve) are shown in Appendix A Figure 1.

Areas not considered within the scope of this report (Package 1), addressed in WAC119946-FAU, are also shown for clarity.

¹ GPS co-ordinates of the centre of the Project area: 172.6751244°E 43.3482830°S.

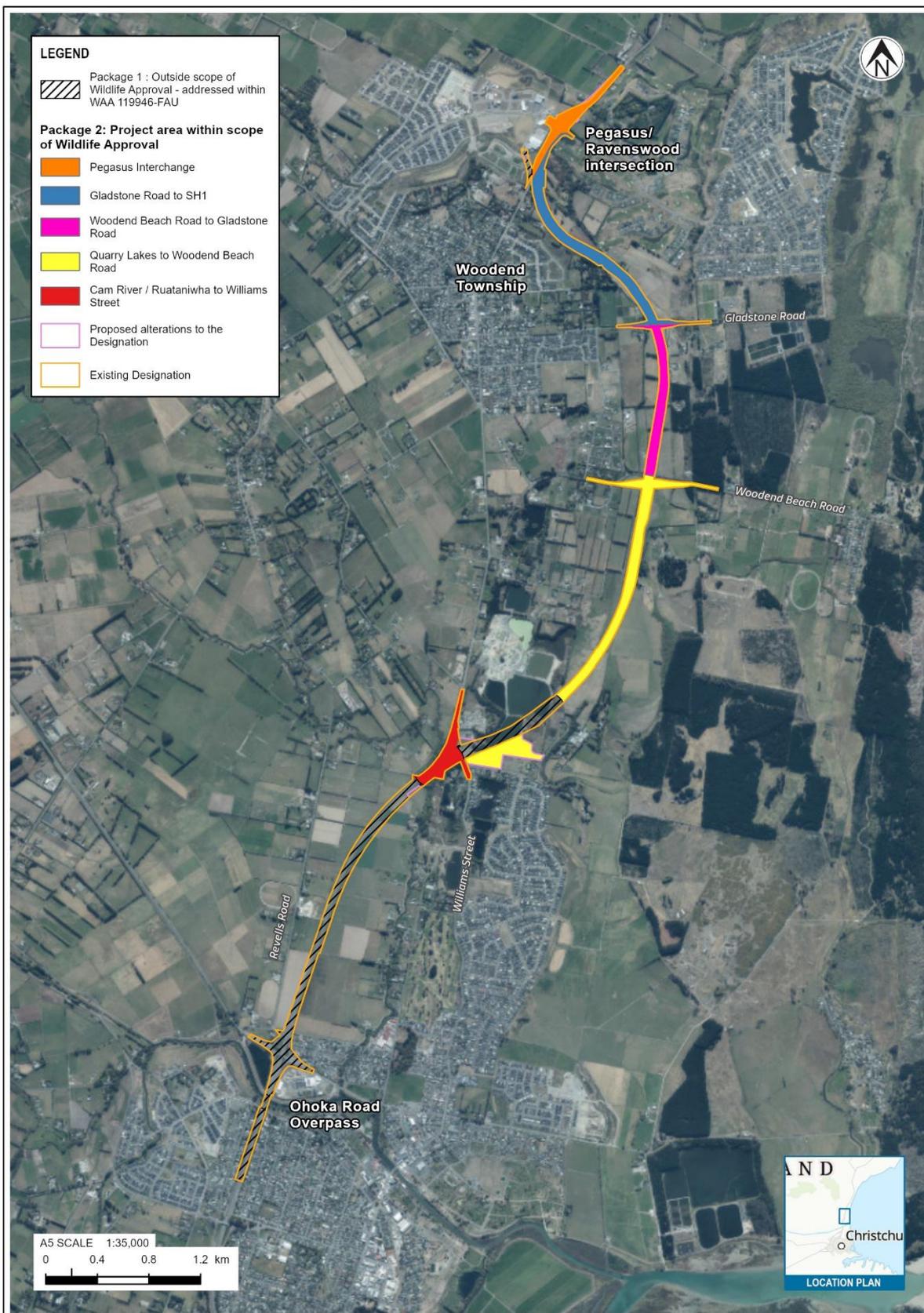


Figure 1.1: Project location and Project area applicable to this Wildlife Approval (WA) report.

1.2 Ecological context

The Project is located within the Canterbury Plains Ecological Region and Low Plains Ecological District (ED). The area has been highly modified for farming and urban expansion, which has resulted in < 1% native vegetation remaining. Vegetation across the Project area is generally characterised by exotic trees (including as shelterbelts), rank exotic and pasture grasses, lawns and garden plantings, with scattered fragments of native plantings.

Detailed terrestrial, wetland and freshwater ecological assessments of the Project area have been undertaken by Tonkin & Taylor Ltd (T+T) and Wildlands Consultants Ltd. (Wildlands) to inform the SAR required under the FTAA. Wildlands were contracted by NZTA to undertake indigenous lizard habitat assessments and targeted lizard surveys between November 2024 and March 2025 (Wildlands 2025a; Appendix D). An overview of indigenous lizard values of the Project area based on these assessments is provided in Section 7 of this report and detailed in the SAR, which concludes that Canterbury grass skink (*Oligosoma* aff. *polychroma* Clade 4) (At Risk-Declining) (Hitchmough et al. 2021), and up to 12.4 ha of suitable lizard habitat is present within the Project area.

2 Scope of report

All indigenous lizards are protected under the Wildlife Act (1953), and appropriate management is therefore required. Lizard salvage and relocation is proposed to minimise effects on indigenous lizard populations impacted by the removal of lizard habitat.

The scope of this report is to support an application for a Wildlife Approval (WA) as part of a substantive application under the FTAA. Authorisation is being sought under Section 43(3)(h) of the FTAA for the following:

- Catching, handling, and marking lizards.
- Salvage and translocation of lizards.
- Incidental injury or mortality of lizards.
- Post-release monitoring of lizards.

This report addresses the specific WA application requirements set out in Clause 2(1) of Schedule 7 of the FTAA, outlined in Table 2.1 below.

Table 2.1: Information required in an application for Wildlife Approval under the FTAA (Schedule 7 Clause 2)

Sub-clause	Information required	Report section
2(a)	Specify the purpose of the proposed activity.	Section 4
2(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).	Section 5
2(c)	Include an assessment of the activity and its impacts against the purpose of the Wildlife Act 1953 .	Section 6
2(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.	Section 7

Sub-clause	Information required	Report section
2(e)	Outline impacts on threatened, data deficient, and at-risk wildlife species (as defined in the New Zealand Threat Classification System).	Section 8 & 13
2(f)	State how the methods proposed to be used to conduct the actions specified under paragraph (b) will ensure that best practice standards are met.	Section 9
2(g)	Describe the methods to be used to safely, efficiently, and humanely catch, hold, or kill the animals and identify relevant animal ethics processes.	Section 10
2(h)	State the location or locations in which the activity will be carried out, including a map (and GPS co-ordinates if available).	Section 11
2(i)	State whether authorisation is sought to temporarily hold or relocate wildlife.	Section 12
2(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.	Section 13
2(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).	Section 13
2(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 .	Section 14
2(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.	Section 15
2(n)	Provide proof and details of all consultation, including with hapū or iwi, on the application specific to wildlife impacts.	Section 16
2(o)	Provide any additional written expert views, advice, or opinions the applicant has obtained concerning their proposal.	Section 17

3 Proposed activity

The 'proposed activity' applicable to this WA application is to salvage and relocate lizards from habitat in the Project area and to undertake post-release monitoring in lizard relocation sites. Salvage and relocation and post-release monitoring activities will require lizards to be caught and handled, and both activities may result in incidental injury or mortality of lizards. Post-release monitoring will also require lizards to be marked using a xylene-free marker pen to enable individuals to be identified.

Sections 4 – 16 in this report are arranged to address the specific requirements of Schedule 7, Clause 2, as specified in Table 2.1 above. A stand-alone Lizard Management Plan (LMP) is not a prescribed requirement of making a WA application under the FTAA; however, details of the proposed lizard salvage and relocation programme are provided in Section 10.

- Additional documents relevant to this WA report include:
 - State Highway 1 North Canterbury – Woodend Bypass Project (Belfast to Pegasus) Substantive Application Report (Volume 2A).
 - State Highway 1 North Canterbury – Woodend Bypass Project (Belfast to Pegasus) Lizard Survey Report (Wildlands, 2025a) (Appendix D of this report).
 - State Highway 1 North Canterbury – Woodend Bypass Project (Belfast to Pegasus) Ecological Impact Assessment (EclA) report (Volume 3I).
 - Lizard Management Plan for Belfast to Pegasus (Woodend Bypass) Road of National Significance – Early Works (Wildlands, 2025b) and WAC 119946-FAU.

4 Purpose of the proposed activity

(a) specify the purpose of the proposed activity:

Salvage and relocation

The purpose of the lizard salvage and relocation activity is to minimise injury or incidental mortality to lizards during vegetation clearance activities. Up to 12.4 ha of vegetation has been identified as potential lizard habitat within the Project area of Package 2 (Table 7.2, Figure 2 A and removal is required to facilitate the construction of the Project. Due to low mobility, lizards may not be able to disperse during site preparation and vegetation clearance works. Removal of potential habitat may result in displacement, stress, injury or incidental mortality of individuals.

A salvage and relocation programme will be implemented two weeks immediately prior to, and during vegetation clearance works (planned to begin in the 2026/27 construction season). Section 10 details the proposed lizard salvage and relocation methods, salvage effort and timings. Lizards will be relocated to suitable relocation site/s (as detailed in Section 10.8) in accordance with DOC's key principles for lizard and salvage transfer (DOC, 2019).

Post-release monitoring

Principle 7 of DOC's key principles of lizard salvage and transfer (DOC, 2019) recommends post-release monitoring to evaluate success of salvage operations. The purpose of the post-release monitoring activity is to:

- Determine lizard population persistence at the lizard relocation site/s.
- Monitor survival of enhancement plantings.
- Monitor pest mammal presence at the lizard relocation site/s.

Annual monitoring will occur over a period of **five years** by a suitably qualified and experienced ecologist to determine presence and relative abundance of lizards across the relocation site/s. Monitoring will commence one year following Project completion.

5 Actions to be carried out involving protected wildlife

(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):

A lizard salvage and relocation programme (detailed in Section 10) will be implemented within identified areas of potential lizard habitat subject to construction works (Figure 2, Appendix A). Some lizard habitat areas may be avoided through the final design, however a conservative approach has been applied and the quantum of habitat loss calculated covers the entire Project area (up to ~12.4 ha).

Lizard monitoring will take place within lizard relocation area/s at Barkers Road and Kaiapoi Lakes Reserve (see section 10.9 and Appendix A Figure 1). A capture-mark-recapture approach is proposed whereby individual lizards are temporarily marked with an ID number following capture allowing recaptured individuals to be identified. This approach allows for a density estimate to be calculated following each monitoring round.

The Project Site includes small areas of public conservation land (as defined under the FTAA), which are identified in Volume 1D, however no construction activities are occurring on this land and consequently no activities involving protected wildlife.

6 Impacts of the activity against the Wildlife Act 1953

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

The purpose of the Wildlife Act is to protect wildlife. By applying the proposed methods to catch, handle and relocate lizards (Section 10) following best practice techniques (Section 9), all reasonable measures to minimise effects on indigenous lizards during habitat removal will be followed.

Potential risks of lizard salvage, relocation, and monitoring, and measures proposed to avoid and minimise these risks are provided in Section 13. Through the implementation of these measures, as well as incidental discovery protocols (detailed in Section 10.7), it is considered that all reasonable measures will be applied to minimise adverse effects on indigenous lizards during the proposed salvage, relocation, and monitoring programme, and is consistent with the protective purpose of the Act.

7 Protected wildlife

(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:

7.1 Species present

Four native lizard species have been recorded within a 10 km radius of the Project (Table 7.1). Of these, Canterbury grass skink (*Oligosoma* aff. *polychroma* Clade 4, At Risk-Declining; Hitchmough et al. 2021) is the only species that has been recorded during surveys associated with the Project (Wildlands, 2025a). The other three species are unlikely or very unlikely to be present based on distribution and/or habitat requirements (Wildlands, 2025a). In the rare event any species other than Canterbury grass skink are caught during the salvage and relocation programme, incidental discovery protocols (outlined in Section 10.7) will be implemented.

Table 7.1: Lizard species recorded within a 10 km boundary of the Project Designation (DOC Herpetofauna Atlas, updated August 2025)

Species name	Common name	Conservation Status (Hitchmough et al. 2021)	Presence
<i>Oligosoma polychroma</i> Clade 4	Canterbury grass skink	At Risk – Declining	Confirmed
<i>Oligosoma maccanni</i>	McCann’s skink	Not Threatened	Unlikely
<i>Oligosoma polychroma</i> Clade 5	Southern grass skink	At Risk – Declining	Highly unlikely

Species name	Common name	Conservation Status (Hitchmough et al. 2021)	Presence
<i>Woodworthia cf. brunnea</i>	Waitaha gecko	At Risk – Declining	Highly unlikely

7.2 Lizard habitat

Canterbury grass skink have broad habitat preferences and are often found in modified environments like those in the Project area, including agricultural margins, road verges, disturbed grasslands or rocky habitats. Up to ~12.4 ha of potential lizard habitat of varying types and ecological value is present across the Project area (Appendix A Figure 2) and comprises:

- Exotic grassland/scrub mosaic (~4.1 ha)
- Exotic treeland (~3.5 ha)
- Exotic shelterbelt (~2.3 ha)
- Rank grassland (~2.1 ha)
- Indigenous plantings (~0.4 ha)

The area of lizard habitat within the Project area is less than the area estimate provided by Wildlands (Wildlands, 2025a; Appendix D). The Wildlands Lizard Survey Report includes some of the initial works areas addressed under Package 1 (out of scope of this Wildlife Approval report and considered under 96003-FAU).

An aerial survey of the Project area was undertaken in June 2025, and images collected in this survey were used as the basemap for all figures in this report. Lizard habitat polygons provided by Wildlands were mapped and adjusted by T+T to better align with vegetation types visible in the updated aerials. Lizard habitat polygons were also extended to incorporate all areas of contiguous habitat of the same type, regardless of whether lizards were detected during surveys or not. The absence of detections during the survey does not preclude occasional use of these habitats, and it has been conservatively assumed that lizards may be present within all contiguous habitat of the same type. During site visits in August 2025, areas of lizard habitat were further ground-truthed and refined by T+T. Descriptions of the lizard habitat and associated value in accordance with the EIANZ Ecological Impact Assessment Guidelines (Roper-Lindsay et al. 2018) are provided below.

7.2.1 Exotic grassland/scrub mosaic (4.1 ha)

Mosaic areas of exotic scrub and grassland habitat with undisturbed rank grass offer moderate value due to greater habitat complexity, shelter and cover for lizards. Key species and vegetation types within this habitat type include:

- Broom (*Cytisus scoparius*) and lupin (*Lupinus arboreus*) shrubland with local blackberry (*Rubus fruitcosus* agg.) and gorse and dense exotic grass cover beneath the shrub canopy.
- Cocksfoot (*Dactylis glomerata*), browntop (*Agrostis capillaris*) and tall fescue grassland.
- Marram (*Calamagrostis arenaria*) and pampas grass.
- Patchy exotic herbfield with highly variable composition. Species noted include sheep's sorrel (*Rumex acetosella*), cutleaf burnweed (*Senecio glomeratus*), broad-leaved fleabane (*Erigeron bonariensis*), fireweed (*Senecio hispidulus*), yarrow (*Achillea millefolium*), and musky storksbill (*Erodium moschatum*).

Greater lizard numbers were detected in this vegetation type, particularly around the Gladstone Road area and a larger area further north (Figure 2 Sheet 8, Appendix A). A representative photograph of this habitat type is provided in Appendix B (Photograph B.1).

The Barkers Road relocation site (Section 10.9) currently comprises exotic grassland/scrub mosaic vegetation with a confirmed population of Canterbury grass skink. This area will be enhanced prior to lizard release and lizard monitoring will be undertaken.

7.2.2 Exotic treeland (~3.5 ha)

Areas of **low** value exotic treeland are present in various locations throughout the Project area, dominated by mature crack willow (*Salix x fragilis*). Ground cover vegetation beneath the tree canopy is varied and includes sporadic patches of bare earth. Rank grass, exotic herbfield, leaf litter, blackberry, Hawthorn (*Crataegus monogyna*), spindle (*Euonymus europaeus*), gorse, broom, and karamū (*Coprosma robusta*) are sparsely scattered through the understorey, particularly on edges.

Canterbury grass skink were recorded within some of the areas of exotic treeland. The low stature vegetation present within this habitat type provides marginal quality habitat for lizards and it is likely that the habitat is only used on occasion. A representative photograph of this habitat type is presented in Appendix Photograph B.2.

7.2.3 Exotic shelterbelt (~2.3 ha)

Exotic shelterbelts including species such as willow (*Salix sp.*), poplar (*Populus sp.*) and pine (*Pinus sp.*) provide limited habitat for lizards. However discrete areas of exotic groundcover and organic debris beneath the shelterbelts provide **low** value habitat. A low number of lizard detections were recorded in these areas. A representative photograph of this habitat type is presented in Appendix B (Photograph B.3).

7.2.4 Rank grass (~2.1 ha)

Low value rank grass (e.g. Cocksfoot) is present within the Project area and in some areas is disturbed through mowing, vehicle access or dumping. These areas are considered to be of low value lizard habitat, however lizards may be present in discrete areas. A representative photograph of this habitat type is presented in Appendix B (Photograph B.4).

7.2.5 Indigenous plantings (~0.4 ha)

The riparian margins of the Taranaki and Waihora Streams near the Pegasus Interchange have been planted with various indigenous species, largely comprising *Carex sp.*, *Juncus sp.* and tī kōuka. Additional indigenous species are present in small numbers within the riparian margins of these streams, and include kōhūhū and mānuka. Canterbury grass skink may be present. Potential lizard habitat within this section was not surveyed in the 2024/2025 lizard survey (Wildlands 2025). However, the area is considered to offer potential, **low** value habitat for lizards. A representative photograph of this habitat type is presented in Appendix B (Photograph B.5).

7.2.6 Debris piles

Discrete areas of woody organic and refuse debris piles are also present within the Project area and offer suitable lizard habitat, particularly larger piles located near Gladstone Road and a large area further north, as shown in Figure 2 sheet 8, Appendix A. A representative photograph of this habitat type is presented in Appendix B (Photograph B.6).

Lizard habitat types, area, value and locations within the Project area are shown in Table 7.2 and Figure 2, Appendix A.

Table 7.2: Lizard habitat types, value and locations within the Package 2 Project area²

Section of the Project Site	Habitat type	Area (ha)	Habitat value (in accordance with section 5.7 of EclA report (T+T 2025) and EclAG ³)	Lizards confirmed present (based on Wildlands 2025a surveys)
Cam River / Ruataniwha to Williams St	Exotic shelterbelt	0.2	Low	Y
	Exotic treeland	1.0	Low	Y
	Rank grass	0.5	Low	Y
Quarry Lakes – Woodend Beach Road	Exotic shelterbelt	1.1	Low	N
	Exotic shrubland and grassland mosaic	0.9	Moderate	Y
	Exotic treeland	0.1	Low	N
	Rank grass	0.1	Low	Y
Woodend Beach Road – Gladstone Road	Exotic shelterbelt	0.7	Low	Y
	Exotic treeland	0.5	Low	Y
	Rank grass	0.1	Low	Y
Gladstone Road – SH1	Exotic shelterbelt	0.2	Low	Y
	Exotic shrubland and grassland mosaic	3.2	Moderate	Y
	Exotic treeland	1.7	Low	Y
Pegasus Interchange	Rank grass	0.9	Low	Y
	Exotic shelterbelt	0.1	Low	Y
	Exotic treeland	0.2	Low	Y
	Rank grass	0.5	Low	Y
	Amenity & indigenous plantings	0.4	Low	N
Total area		12.4	8.3 ha (low) 4.1 ha (moderate)	

7.3 Lizard survey findings

An initial habitat assessment was undertaken by Wildlands in October 2024, followed by targeted surveys across the site, including manual searches, tracking tunnel, funnel trapping and ACO surveys conducted between December 2024 and March 2025 (Wildlands, 2025a).

² Note: the Barkers Road relocation area is excluded from this table because no habitat removal will be undertaken.

³ Ecological Impact Assessment Guidelines (EclAG) published by the Environmental Institute of Australia and New Zealand (Roper-Lindsay et al., 2018). The guidelines provide a standardised framework allowing a consistent and transparent assessment of ecological values and effects.

In total, 134 Canterbury grass skinks were recorded across the entire Project (Package 1 and Package 2) (105 ha). Thirty-nine were captured and 95 were observed during surveys. Skinks were also detected in 41 out of 128 tracking tunnels (32%). Detailed survey results are presented in Wildlands (2025a; Appendix D) and locations of skink detections (captures and observations) are also shown in Figure 2 Appendix A.

7.4 Impacted population and lizard salvage estimate

Estimating lizard population size within the Project area is constrained by low detectability, cryptic behaviour, and variable survey capture rates. Based on the survey methodology, results and site observations (Wildlands, 2025a), current data only allow for confirmation of presence/absence rather than abundance or relative density. Mark recapture data are required to determine reliable lizard population estimates.

Due to the fragmented nature of the lizard habitats within the Project area, lizard populations are likely to be restricted by habitat size, habitat and food quality, localised pest animal activity, and the level of ongoing disturbance. While the habitat quality is mostly of low-moderate value, there may be “hotspots” of discrete habitat where lizards may be locally abundant.

A precautionary approach has been taken to estimate the number of lizards that may be salvaged. Based on estimates by Wildlands for Package 1 of the Project (WAC 119946-FAU), an estimate of 225 lizards is expected to be salvaged from 2.94 ha of similar, largely low value habitat, equating to 77 lizards/ha (Wildlands, 2025b).

Based on these calculations, the salvage estimate for Package 2 (main construction works applicable to this WA) has been derived as follows:

Low value habitat: $\sim 8.3 \text{ ha} \times 77 = \sim 640$ lizards

Moderate value habitat: $\sim 4.1 \text{ ha} \times 150 = \sim 615$ lizards (Higher salvage numbers are anticipated in moderate value habitat vs. low value habitat).

Total: 1,255 (~100 lizards/ha)

However, because lizard salvage numbers are often underestimated, a 20% contingency is added to the salvage estimate, resulting in a salvage estimate of **~1,500 lizards**. Note that this estimate is based on removing the total area of lizard habitat within the Project area (~ 12.4 ha), which will likely be reduced as the Project design is refined.

The salvage estimate is used to ensure that the size of the lizard relocation site/s and enhancement measures required to improve lizard carrying capacity (see Section 10.9.6) are sufficient in the event lizard numbers are higher than expected.

It will be possible to further refine the salvage estimate following completion of the salvage and relocation programme for Package 1 of the project (Wildlands, 2025b). The number of lizards salvaged will provide an indication of anticipated lizard salvage numbers for Package 2 (applicable to this WA).

8 Impacts on threatened, data deficient, and at-risk species

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

Canterbury grass skink are classified as At Risk – Declining (Hitchmough et al. 2021).

McCann's skink (Not Threatened), Southern grass skink and Waitaha gecko (both At Risk – Declining) have been found previously within 10 km of the Project site but are very unlikely to be impacted due to lack of suitable habitat. In the unlikely event they are found, incidental discovery protocols (see Section 10.7) will be implemented.

Potential impacts of the activity, salvage and relocate lizards include stress, injury or incidental death during habitat removal and implementation of the lizard salvage and relocation programme (section 10). Potential risks and impacts on lizards are considered further in Section 12.

9 Best-practice standards for lizard salvage

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

The proposed salvage and relocation methods (detailed in Section 10) are consistent with standard best-practice methodologies from DOC's Inventory and Monitoring Toolbox: Herpetofauna (Hare, 2012 a,b,c), sampling techniques for New Zealand lizards (Lettink and Hare, 2016) and in accordance with Principle 5⁴ of DOC's key principles for lizard salvage and transfer (DOC, 2019). The proposed methods are commonly used on land development and roading projects. The methodologies have been adapted for local site conditions and scaled to the low-moderate lizard habitat present.

The lizard salvage and relocation programme will be led by a suitably experienced Project Lead Herpetologist with support from other ecologists with lizard salvage and relocation experience. All personnel must be experienced in lizard handling, including salvage and relocation operations, and be named on a Wildlife Approval administered by DOC to capture, handle and relocate protected native lizards.

10 Methods to safely catch, hold and relocate lizards

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

10.1 Salvage and relocation overview

A salvage and relocation programme will be implemented within all areas of lizard habitat to avoid or minimise injury or harm to Canterbury grass skinks, as far as practicable. Lizard salvage and relocation for Package 2 will be implemented over two stages:

- Stage 1 – pre-clearance works.
- Stage 2 – vegetation clearance works.

Salvage activities to be undertaken during each stage are detailed below, including specific methods and scale of effort. A flexible approach using a toolbox of best-practice methods is proposed to be used at the Project Lead Herpetologist's discretion depending on lizard micro-habitats and quality of lizard habitat within the Project.

All lizards salvaged will be relocated to a relocation site/s that will be enhanced in accordance with the measures outlined in Section 10.9.

⁴ Principle 5: "Lizard salvage, transfer and release must use the best available methodology", DOC (2019).

10.2 Timing of salvage and relocation

Salvage will be undertaken during October to April inclusive. Salvage will only be undertaken in accordance with suitable weather requirements as defined below:

- Minimum average temperatures of 12°C.
- Maximum temperature of 25°C.
- Light winds and no rain heavier than 0.1 -2 mm per hour (light drizzle).

Stage 2 (vegetation clearance works) must commence within two weeks of the completion of Stage 1 pre-clearance works. If vegetation removal does not occur within the two-week window following pre-clearance salvage, lizards may move back into the works area. Should this occur, the pre-clearance salvage efforts will need to recommence.

10.3 Stage 1: Pre-clearance works

10.3.1 Site preparation and staging

Prior to commencement of any vegetation clearance, the extent of vegetation to be removed will be demarcated and discussed with Project Lead Herpetologist. Efforts will be made to minimise the loss of potential lizard habitat through reducing the footprint to the extent practicable.

It is recommended that a silt fence is established (where practicable) prior to lizard salvage commencing to minimise the risk of displaced lizards homing back to the construction area. The fence is to be removed once the vegetation clearance stage is complete. Exclusion fencing will be used at the direction of the Project Lead Herpetologist.

Two weeks prior to clearance works, suitably experienced ecologist/s will implement search and salvage methods to search for lizards in all identified lizard habitat to be removed (Figure 2, Appendix A). It is unlikely that all vegetation clearance will be completed in one season. Therefore, timeframes and staging of salvage will be dependent on final construction programme requirements and seasonal constraints. A combination of live trapping techniques and systematic manual salvage will be implemented, as described in sections below and summarised in Table 10.1.

Prior to commencement of any vegetation clearance activities or construction, pre-start meetings will be held with the Site Manager, Project Lead Herpetologist and Client Representatives to discuss requirements for lizard habitat removal. It is recommended that an LMP is prepared detailing the approach to lizard management for the project. All parties must review and understand the Project Lizard Management Plan (LMP).

10.3.2 Live trapping

Prior to vegetation clearance, a combination of live pitfall and funnel trapping (using gee-minnow traps) will be undertaken in accordance with standard best-practice trapping protocols (Hare 2012a, Hare 2012b). Traps will be deployed in areas of suitable lizard habitat (Figure 2, Appendix A), using a combination of funnel and pitfall traps, as deemed appropriate by the Project Lead Herpetologist. Funnel traps should be used with caution, as high mouse densities were detected during previous surveys (Wildlands, 2025a) and trap predation may occur. Pitfall traps will be used in most cases, however in discrete areas, e.g. lizard habitat areas with soil bunds, funnel traps may be more appropriate. The trapping technique may be changed at Project Lead Herpetologist's discretion. If pitfall traps are not suitable for a particular site, and there is potential for high mice densities, funnel trapping efforts may be supplemented with pest mammal control to reduce predation risks. This will be undertaken at the discretion of the Project Lead Herpetologist.

10.3.2.1 Pitfall traps

Pitfall traps will comprise a plastic container (>2 litre volume) dug flush with the ground. Pitfall traps will be covered with Onduline covers. Pitfall traps will be filled with grass, soil or vegetation and a damp sponge. Traps will be initially installed closed or filled with vegetation/soil/sticks to allow lizards to become habituated to the traps and to the allowed the traps to 'settle in'. Multiple holes will be drilled into the bottom of the buckets to prevent flooding. Holes will be small enough that no juvenile lizards can fall through.

10.3.2.2 Funnel traps

Funnel traps will be set the day before monitoring commences, baited with canned pear (or other suitable bait) and padded with grass to provide shelter, prevent desiccation and mouse predation. The funnel trap will be covered with grass or vegetation and established in appropriate habitat. A damp sponge will be included in each trap to reduce desiccation risk, as per the DOC Herpetofauna Monitoring Toolbox for Funnel Trapping; Hare, 2012b).

10.3.2.3 Spacing and density of traps

Pitfall and funnel traps will be spaced 5-10 m apart in grid formation (where feasible) in areas of suitable habitat.

A minimum of 100 pitfall or funnel traps per hectare will be installed (10 x 10 m spacings) within areas identified as lizard habitat. The total area of lizard habitat to be removed is up to ~12.4 ha. At 10 m spacings, this equates to a minimum of 1,240 traps across the Project.

In areas of moderate quality lizard habitat (~4.1 ha) and debris piles, salvage efforts may be bolstered in areas of discrete lizard habitat by increasing the spacing of traps to 5 m intervals (at the Project Lead Herpetologist's discretion). For example, a larger number of lizards may be salvaged from organic debris piles, therefore increasing the trapping density to 5 m spacings would be prudent in these areas.

10.3.2.4 Trapping duration and frequency of checks

All pitfall traps will be installed at least one week prior to the start of the trapping period, to allow for lizards to become habituated to the traps and for the traps to 'settle in'. To prevent harm to lizards, traps will be closed and deactivated when not in use and during poor weather conditions.

Traps will be checked daily (every 24 hours) and trapping effort will be scaled based on lizard habitat quality as follows:

- Low value habitat (~8.3 ha ha): minimum 4-night trapping period (consecutive nights).
- Moderate value habitat (~4.1 ha): minimum 8-night trapping period (two blocks of four consecutive nights).

It may not be possible to undertake 8 consecutive trapping nights due to weather conditions and/or resourcing requirements, therefore two 4-night consecutive periods of salvage in moderate value habitat are recommended, where possible. In the event weather conditions regularly prevent consecutive trapping nights, the trapping duration may need to be adapted at the Project Lead Herpetologist's discretion.

If lizards are still being caught within the last two days of the trapping period, trapping will continue for a further 3-day period in both low and moderate value habitat. Beyond this, if lizards are still being caught, further trapping will be undertaken at the Project Lead Herpetologist's discretion.

All native lizards will be released at a pre-determined relocation site (see Section 10.8) the same day as capture.

10.3.3 Systematic manual salvage

Systematic daytime manual salvage techniques will be applied in coordination with the live trapping salvage works, prior to vegetation clearance. Systematic searches are commonly used for lizard surveys (Hare, 2012c) and will include:

- Turning over or pulling apart cover objects (e.g. coarse woody debris, rocks, artificial refuges, wooden boards, fenceposts).
- Raking of litter or ground cover (e.g. pampas).
- Searching of rock piles and crevices.

Systematic manual salvage will be undertaken whilst checking the live traps deployed in each salvage area. Discrete areas of lizard habitat such as woody debris piles will be intensively manually searched prior to and during removal. If practicable, any debris piles (e.g. coarse woody debris and branches) present within the lizard salvage areas will be moved to the relocation site for habitat enhancement purposes (see Section 10.9.6). Search effort will be determined by the Project Lead Herpetologist on a case-by-case basis guided by factors such as habitat complexity, number of lizard captures from live trapping methods, and proximity to other areas of confirmed lizard habitat.

10.4 Stage 2: Clearance works

Once the Project Lead Herpetologist is satisfied that no further lizard habitat can be searched by hand using the systematic search and trapping methods implemented in Stage 1, vegetation clearance and machine-assisted salvage can commence (Stage 2).

Machine assisted salvage will be undertaken in areas where skinks are found during pre-clearance searches and trapping in Stage 1. An ecologist will be on site during removal of this vegetation.

In areas where skinks are **not** found and salvaged using the systematic manual searching and live trapping methods in Stage 1, vegetation clearance can proceed **without** supervision by an ecologist. All unsupervised vegetation clearance will occur within one week of the Stage 1 salvage works, to ensure that lizards do not disperse into these areas.

10.4.1 Machine-assisted salvage

Machine assisted salvage during vegetation clearance will include:

- Removal of large cover objects that cannot be searched manually (e.g. boulders or large decomposing logs).
- Supervision of groundcover scraping by excavator of ground-cover habitat (e.g. dense pampas, blackberry, gorse) and logs/rocks/debris that cannot be searched manually.
- Line trimming of rank grass or other low stature vegetation using a mulching head or scrub cutter as appropriate.

Machine-assisted salvage (e.g. using excavators) can increase the risk of injury or mortality to native lizards. The machine-operator will co-ordinate with the ecologist/s to ensure machine assisted salvage is undertaken following best-practice methods to reduce lizard injury and mortality to the extent possible.

Prior to removal of rank grass habitat, these areas can be managed and reduced using a line-trimmer to encourage skinks to disperse from these areas. An ecologist will be present to check the rank

grass immediately following reduction. No specific level of effort is specified for this salvage method. Line trimming will be undertaken until all rank grass has been reduced.

10.5 Salvage effort summary

Table 10.1: Salvage methods and effort

Salvage method	Lizard habitat quality	Salvage effort	Trap density / minimum no. of traps	Additional effort
Stage 1: Pre-clearance works (within two weeks prior to vegetation clearance)				
Funnel trapping & pitfall trapping	Low (up to ~8.3ha)	Four night minimum Traps will be baited and checked daily (every 24 hours).	10 x 10 m spacings (where appropriate). Minimum number of traps: 830.	If skinks are still being caught on the last day of salvage (day 4 in low value habitat and day 8 in moderate value habitat), trapping will continue for up to 3 further consecutive days.
	Moderate (up to ~4.1 ha)	Eight night minimum Traps will be baited and checked daily (every 24 hours).	10 x 10 m spacings (where appropriate). Minimum number of traps: 410 (at 10 m spacings) Increase to 5 x 5 m spacings in discrete areas of dense lizard habitat.	Beyond this, if lizards are still being caught, further trapping will be at the direction of the Project Lead Herpetologist.
Systematic manual salvage	Low (up to ~8.3 ha) Moderate (up to ~4.1 ha)	At discretion of Project Lead Herpetologist. Search effort will be determined by factors such as habitat complexity, number of lizard captures, and proximity to other areas of confirmed lizard habitat.	N/A	N/A
Stage 2: Clearance works				
Machine assisted salvage	Low (up to ~8 ha) Moderate (up to ~5 ha)	Machine assisted salvage / vegetation clearance supervision will occur in areas where lizards are salvaged during Stage 1 pre-clearance works.	N/A	N/A

10.6 Data collection

Each individual lizard captured will be assigned a number and the following information recorded:

- Date and time of capture.
- Weather conditions.
- Capture methodology.
- Capture location and relocation location (GPS co-ordinates).
- Micro- and macro-habitat types at capture location and at relocation site.
- Species, sex, reproductive status for females, tail status (regenerating/lost/original), overall health and condition, Snout to Vent Length.
- A minimum of one photograph of each captured lizard, including at least one photograph to clearly show the dorsal surface.

10.7 Incidental discovery protocol

If any live lizards are found during works (outside of the salvage and relocation programme) the following steps will be implemented:

- If a lizard is seen but unable to be caught, the sighting must be reported to the Project Lead Herpetologist and description of location, size, colour patterns and habitat it was observed provided.
- If possible, any lizards will be captured and placed in a container with grass or leaf litter. The container should be out of the sun, in a cool, shady spot. The Project Lead Herpetologist will be notified, and the species will be identified. If a Canterbury grass skink or Southern grass skink (albeit unlikely) is captured, it will be released in the designated lizard relocation site by the Project Lead Herpetologist.
- Albeit very unlikely, if any other nationally 'At Risk' or 'Threatened' lizard species is found (as identified by the Project Lead Herpetologist), DOC will be notified, and advice will be sought on how best to proceed. Works may not continue until approval has been agreed by the Project Lead Herpetologist.
- Contractors will be briefed on the lizard incidental discovery protocols, relevant lizard information (including photos and what to look out for) at Project pre-start meetings.

If any injured or dead native lizards are found, the following steps will be implemented:

- The Project Lead Herpetologist will notify the local DOC office at the earliest opportunity within 24 hours after an injured or dead lizard found. If the local DOC office is not available, the DOC emergency hotline will be contacted instead (0800 DOC HOT / 0800 362 468).
- Any lizard mortality of 'Threatened,' 'At Risk', or 'Data Deficient' species shall be sent to Massey University Wildlife Post-mortem Service for necropsy if required by DOC. The body is to be chilled if it can be delivered within 24 hours, frozen if longer than 24 hours to deliver.
- Injured lizards found during salvage will be taken by an Ecologist to a suitably qualified vet as soon as possible for assessment and treatment. Injured lizards will be kept in an appropriate portable enclosure (i.e., a clean, well-ventilated plastic container) under the direction of the Project Lead Herpetologist to ensure the animal is handled appropriately until the lizard(s) can be assessed and treated.
- Lizards assessed by the vet or alternative specialist as uninjured, or otherwise in suitable condition for release, will be transported to the lizard relocation site and released into habitat suitable for the species being relocated.

- Euthanasia of an injured lizard shall only be undertaken under direction from DOC.
- The reasons behind the injury or mortality will be assessed by the Project Lead Herpetologist who may adapt management measures where possible to reduce further injury or mortality.

10.8 Relocation protocols

10.8.1 Capture, handling and transport

Capture, handling and transport of lizards will be undertaken in accordance with the following methodologies:

- All field equipment that native lizards may come into contact with (e.g. plastic enclosures, collection bags, scales, etc.) will be sterilised prior to and between uses.
- Hand sterilisation will be undertaken between handling individuals.
- Salvaged lizards will either be placed in cloth bags (only during salvage, not during transportation), or in suitable ventilated plastic containers.
 - Vegetation / leaf litter will be added to plastic containers to shelter and protect lizards during transportation.
 - Cloth bags will be kept in the shade to ensure a constant ambient temperature is maintained for the lizards.
- Where practical, native lizards will be placed into cooled, ventilated two litre or larger plastic containers for no longer than four hours for transportation and relocation. Containers will be kept shaded to avoid heat stress.
 - Larger individuals will be in separate cloth bags to prevent aggressive interactions or predation.
 - Any injured lizards will be kept separate to other lizards.
 - Different species will be kept separately.
- Salvaged lizards will be released within eight hours of capture, will be checked for any signs of stress or illness and released into suitable refugia.
- Ecologists with experience handling and relocation of lizards will undertake the salvage and relocation programme.

10.9 Lizard relocation sites

10.9.1 Selection process

Several potential relocation sites were identified and considered using a combination of reviewing aerial imagery and existing site knowledge in accordance with DOC (2023) and Principle 6⁵ of DOC's key principles for lizard salvage and transfer (DOC, 2019). Aerial imagery was reviewed to scope potential sites within the wider landscape, with consideration to size, land tenure, topography and existing lizard habitat characteristics. Key criteria of Principle 6 of the lizard salvage guidelines (DOC, 2019) are:

- i The site must be ecologically appropriate and have long-term security.
- ii The habitat at the site must be suitable for Canterbury grass skink.
- iii The site must provide protection from predators.
- iv The site must be protected from future human disturbance.

⁵ Principle 6: "Receiving sites and their carrying capacity must be suitable in the long term" (DOC, 2019).

Other aspects considered included:

- Minimising the distance between the relocation site and the original population (i.e. the Project 'impact' site as far as practicable).
- Potential to enhance the relocation site/s through the establishment of suitable native vegetation, refugia and pest mammal control to increase lizard carrying capacity.

Three lizard relocation/relocation sites will be utilised during Package 2 salvage following a staged approach (10.9.3):

- Kaiapoi Lakes Reserve A (Package 1 relocation site, if capacity remains following completion of Package 1 salvage, see Section 10.9.4).
- Barkers Road A and B (primary Package 2 relocation site with an estimated capacity of 1,500 lizards, see Sections 10.9.2 and 10.9.5).
- Kaiapoi Lakes Reserve B (contingency Package 2 relocation site if greater than 1,500 lizards are salvaged during Package 2).

Locations of the proposed lizard relocation sites are shown in Figure 1, Appendix A.

10.9.2 Carrying capacity estimates of lizard relocation sites

Based on the calculations provided by Wildlands in the Package 1 LMP (Wildlands, 2025b), following habitat enhancement measures, the Package 1 relocation site (Kaiapoi Lakes Reserve A) can house an additional 287 skinks per hectare over and above the "medium-high density" population already present. On this basis, to rehome the estimated 1,500 salvage lizards from the Package 2 project area (see Section 7.4 for the calculation of this salvage estimate), a minimum 5.2 ha relocation site with similar habitat characteristics and values is required.

10.9.3 Lizard relocation site phased utilisation

Phase 1: Kaiapoi Lakes Reserve A

The Kaiapoi Lakes Reserve A relocation site will be used to rehome lizards captured during Package 1 works. The relocation site can house up to 250 lizards (Wildlands 2025b, WAC 119946-FAU), and if fewer than this are salvaged during Package 1 works, lizards salvaged during Package 2 works will be released here until the carrying capacity is reached.

Phase 2: Barkers Road (main relocation site)

The larger relocation site off Barkers Road (~6 ha), (Figure 1, Appendix A) will serve as the main relocation site for the majority of the lizards salvaged from the main construction works (Package 2). A description of this site is provided in section 10.9.5.

Phase 3: Kaiapoi Lakes Reserve B (contingency relocation site)

If in the event Package 2 lizard salvage numbers exceed the 1,500 upper estimate, further enhancement of the Kaiapoi Lakes Reserve is proposed as a contingency or 'spill-over' relocation site. The requirements for further enhancement will depend on the number of additional skinks captured, with a staged approach proposed. Firstly, as per the Package 1 LMP (Wildlands 2025b), additional habitat features will be added to the 0.87 ha Package 1 relocation site to allow the release of an additional 50 individuals. Should additional capacity be required, further enhancement of suitable habitat within the Kaiapoi Lakes Reserve will be undertaken. Lizard salvage numbers will be reviewed at the end of each season to allow salvage estimates to be refined and the need for the contingency relocation site (and associated advance preparation) will be confirmed.

10.9.4 Kaiapoi Lakes Reserve relocation sites

The presence of Canterbury grass skink at the Kaiapoi Lakes Reserve relocation sites was confirmed during surveys undertaken by Wildlands (Wildlands, 2025b). Funnel traps were used in two discrete areas in March 2025 and it was concluded that the site has a “medium-high” density of Canterbury grass skinks (Wildlands 2025b). The total area of the Kaiapoi Lakes reserve is 5.4 ha and two initial relocation areas with suitable habitat within the site (0.41 ha and 0.46 ha respectively) have been identified for the purpose of lizard salvage and release works to be undertaken as part of Package 1 (Figure 1, Appendix A). The relocation site has been approved by DOC under WAC 119946-FAU. As outlined above, lizards salvaged during Package 2 works may be released to this site if required.

Key features of the Kaiapoi Lakes Reserve relocation site include:

- The site is located within 400 m from the Project area.
- The site is within the known range of Canterbury grass skink and a population is present at the site (Wildlands, 2025b).
- Vegetation in the reserve is similar to areas of lizard habitat within the Project area, and consists of blackberry, gorse, broom, exotic rank grass and pampas (Photograph Appendix B.8).
- The relocation site is within a Waimakariri District Council (WDC) reserve and is protected from disturbance in the long-term.
- Pest mammal control (targeting hedgehogs, mustelids, rodents and rabbits) in the initial lizard relocation areas will begin two months prior to lizard relocation for a five-year period. The area and scale of pest mammal control can be extended (up to a further ~2 ha) if the site is required for contingency purposes.
- Other habitat enhancement in the form of pest plant control, native planting and habitat enhancement (in the form of addition of lizard habitat features/refugia) will be undertaken to increase lizard carrying capacity.
- Photos of the Kaiapoi Lakes Reserve relocation site are provided in Appendix B (Photographs B.9 and B.10).

If fewer than 250 lizards are salvaged during Package 1, the first lizards salvaged during Package 2 will be relocation into this site until the carrying capacity is reached. Salvaged lizards will be then relocation into the main relocation site at Barkers Road (see section 10.9.5).

If greater than 1,500 lizards are salvaged from the Package 2 Project area, and the Barkers Road site reaches capacity, there is opportunity to enhance up to an additional ~2ha of the Kaiapoi Lakes Reserve (beyond the lizard relocation areas identified for Package 1). Enhancing additional areas within the currently fenced area of the reserve will increase lizard carrying capacity, allowing the site to be used as a contingency relocation site (Figure 1, Appendix A).

10.9.5 Barkers Road relocation site

A ~6 ha parcel of land on Barkers Road (Figure 1, Appendix A) will serve as the relocation site for the majority of lizards salvaged from the main construction works (Package 2). Most of the Barkers Road relocation site was surveyed using Artificial Cover Objects (ACOs) between December 2024 and March 2025 (Wildlands 2025a). Skinks were detected at five locations within the surveyed area and it is assumed that as the habitat is similar to Kaiapoi Lakes Reserve, a similar density of lizards is present.

Key features of the Barkers Road relocation site include:

- A mosaic of exotic scrub and grassland habitat with isolated patches of rank grasses present throughout (Photograph B.7 and B.8, Appendix B). Dominant shrub species include broom, lupin and pōhuehue, while dominant rank grass species include cocksfoot, browntop and tall fescue. Isolated patches of dense marram grass are also present within this area. Vegetation characteristics are very similar to those in the Kaiapoi Reserve relocation site.
- Areas identified for lizard relocation comprise a variety of suitable micro-habitats for Canterbury grass skink including:
 - Rank grass and exotic shrub communities providing suitable habitat complexity.
 - Areas of exposed sand/duneland for basking.
 - Proximity to water source (wetlands).
- The relocation site is within the known range of Canterbury grass skink and skinks have been detected at the site (based on visual observations and surveys using ACOs; Wildlands, 2025a; Figure 10.1).
- The site is adjacent to the Project designation, and a 20 m buffer planted between the edge of the designation and the edge of the relocation site is proposed (Figure 1 Appendix A). During construction works, a lizard exclusion fence is proposed to prevent lizards moving into the active construction area.
- The site is adjacent to an area identified for wetland offset as part of the broader ecological offsetting package required for the Project.
- The site is connected to other surrounding areas of lizard habitat, allowing lizard dispersal into the wider environment.
- Long term ownership and security is confirmed through Crown ownership with options of the establishment of a protection covenant in perpetuity if sold, or NZTA may vest the site to WDC.
- The site is approximately 6 ha and following habitat enhancement to increase lizard carrying capacity, will sustain the maximum estimated lizard numbers (1,500) anticipated from the main construction salvage works and existing lizard population (see section 10.9.2).
- The ~6ha area will be divided into two portions ('A' and 'B'). Portion A (~4 ha) will be used as the first lizard relocation site. Depending on the numbers of lizards caught, Portion B (~2ha) will be used as a relocation site in either the second or third construction season (if required).
- Photos of the Barkers Road relocation site are provided in Appendix B. An assessment of site suitability against DOC's key principles for lizard salvage and transfer (DOC, 2019) is provided in Appendix C.

Specific details regarding habitat enhancement measures at the relocation site/s, post-relocation lizard monitoring and reporting requirements will be included in a Lizard Management Plan (LMP), which will likely be required as a condition of resource consent and Wildlife Approval. An overview of the proposed enhancement measures and monitoring is provided in Section 10.9.6.

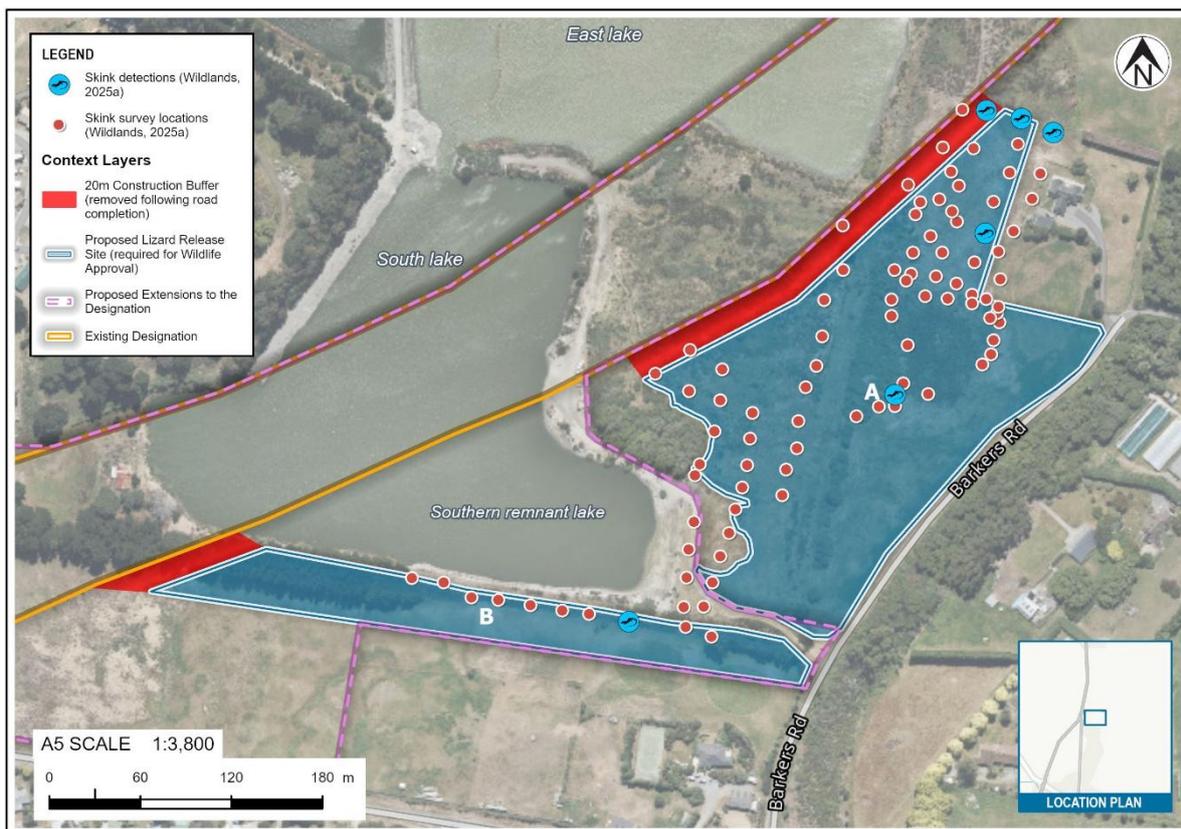


Figure 10.1: Lizard survey locations and detections at the proposed Barkers Road relocation site.

10.9.6 Relocation site enhancement measures

Enhancement measures proposed at both the Barkers Road and Kaiapoi Lakes Reserve contingency site (if required) will include:

- Pest plant control.
- Enhancement planting.
- Habitat/refugia enhancement.
- Pest mammal control.

Collectively, it is anticipated that the proposed relocation site enhancement measures will increase the overall quality of lizard habitat within the relocation site/s, provide additional resources and increase the carrying capacity for existing and released lizard populations. While enhancement planting will not increase carrying capacity in the short-term, it will provide permanent cover and improved refuge in the medium-long term. There is a paucity of studies in New Zealand that have specifically investigated lizard carrying capacity levels following habitat enhancement. Although not specific to Canterbury grass skink, which remains relatively under-studied, there are however several studies that demonstrate the benefits of pest mammal control for ground-dwelling lizards (Reardon et al. 2012; Woolley 2021). Herbert (2020), McGee (2023) and Herbert et al. (2024) also found that for Northern grass skink (*Oligosoma polychroma*), pest mammal control combined with targeted habitat enhancement improved survival and occupancy rates of native lizards in urban sites.

An overview of the proposed enhancement measures is provided below. Lizard habitat enhancement at the relocation sites will be detailed in a Lizard Management Plan (LMP) for the Project. NZTA will commission approved contractors to undertake pest plant control, enhancement

planting and pest mammal control activities prior to any lizard salvage and relocation activities. Pest plant control and enhancement planting will commence a minimum of six months prior to any lizard relocation and pest animal control and addition of lizard habitat/refugia will commence a minimum of two months prior to any lizard relocation.

10.9.6.1 Pest plant control

Pest plant control will be undertaken across the proposed lizard relocation site to support the successful establishment of enhancement planting and prevent the sites from becoming overgrown.

Prior to undertaking pest plant control, the site will be assessed by a suitably qualified contractor to determine the presence and extent of the listed pest species. The findings of this assessment will guide the selection of appropriate control methods and the scale of implementation required.

Pest plant control will be undertaken when weeds are more easily identified and targeted, and when control efforts are likely to be most effective (i.e. main growing season). All control measures will be carried out in accordance with manufacturers' guidelines, current best practice procedures, and the New Zealand Standard for agrichemical management (NZS 8409:2021). Where necessary, signage will be installed to inform the public of ongoing weed control activities.

Pest plant monitoring will commence a minimum of six months before any lizard relocation activities and will be carried out for two years following initial control, alongside enhancement planting monitoring (Section 10.9.3.2).

10.9.6.2 Enhancement planting and maintenance

The relocation sites will be planted with "lizard friendly" plantings (Table 10.2) to be consistent with those recommended for Package 1 (initial project works).

Enhancement planting will increase the complexity of the habitat, provide a wide range of resources for lizards and increase lizard carrying capacity in the medium-long term. Once the site has been assessed prior to undertaking pest plant control, the estimated number of plants will need to take into account current vegetation within the areas and the need for open areas to add additional lizard habitat units (e.g. coarse woody debris / logs).

Plants will be of minimum 1.5 L/PB3 grade to facilitate effective ground cover over a shorter timeframe. Due to the staged placement of additional lizard habitat/woody refugia (section 10.9.3.3), open areas will need to be left to allow for woody debris placement, if required. These areas will be in open, unshaded locations to provide suitable basking opportunities for lizards. In addition, areas for woodpiles will be placed in well-draining, dry parts of each release area to avoid the risk of inundation.

The use of weed mats, mulch, bark and woodchip in the enhancement areas will be avoided. These types of ground covers inhibit the establishment of suitable habitat and vegetation often relied upon by lizards for cover, reduce and presence of invertebrate communities that provide important food resources for lizards (DOC, 2023). Small amounts of woodchip may only be used around the bases of new plantings if required for weed suppression.

Table 10.2: Example species for lizard enhancement at relocation sites (Wildlands, 2025b)

Species	Common name	Benefits to lizards
<i>Poa cita</i>	Silver tussock	C, I
<i>Festuca novae-zelandiae</i>	Fescue tussock	C, I

Species	Common name	Benefits to lizards
<i>Carex virgata</i>	Swamp sedge	C, I
<i>Carex secta</i>	Pūrei	C, I
<i>Carex buchananii</i>	Cutty grass	C, I
<i>Muehlenbeckia complexa</i>	Scrub pōhuehue	C, R, N, F
<i>Muehlenbeckia australis</i>	Large-leaved pōhuehue	C, R, N, F
<i>Muehlenbeckia astonii</i>	Shrubby tororaro	C, R, N, F
<i>Coprosma propinqua</i>	Mingimingi	C, N, F, I
<i>Coprosma crassifolia</i>	Thick-leaved coprosma	C, N, F, I
<i>Austroderia richardii</i>	Toetoe	C, R, I
<i>Cordyline australis</i>	Cabbage tree	R, F
<i>Phormium tenax</i>	Lowland flax	C, R, N
<i>Carmichaelia australis</i>	Native broom	C, I

Note: Key to known benefits of lizards: C = Cover, R = Retreats, N = Nectar, F = Fruit, I = Invertebrates.

Plant monitoring and maintenance will be required to assess the establishment and survival of enhancement plantings. Plant maintenance will include regular weed control, replacement planting to maintain coverage and ecological integrity. Mulching should not be undertaken and care should be taken when using herbicides and insecticides in and around lizard habitats.

10.9.6.3 Habitat/refugia enhancement

To increase the amount of suitable lizard habitat, provide additional shelter and protection from predators, and increase lizard carrying capacity within the relocation sites, habitat enhancement will be undertaken through the deposition of woody debris and logs. The placement of woody debris/wood piles will be supervised by the Project Lead Herpetologist to ensure they are placed correctly and ensure that disturbance to the site is minimised. Habitat /refugia enhancement will be implemented in stages, aligned with the salvage and relocation programme over a two - three year salvage timeframe.

10.9.6.4 Pest mammal control

Pest mammal control will be implemented a minimum of three months prior to the commencement of the lizard salvage and relocation programme, to give the traps time to settle in. Pest management will continue for five years following lizard release. Details of pest mammal control and monitoring to be undertaken at the lizard relocation site/s will be included the Project LMP.

Pest mammal control may include the following aspects, but subject to change based on the relocation site characteristics and pest control contractor requirement:

- Pest mammal control will initially be undertaken either over fortnightly or monthly cycles depending on the trap used and level of bait take within bait stations.
- Possum and rat control using a 100 m x 50 m ground-based trap and bait station grid network or clusters within lizard release areas. A minimum bait station intensity of 50 m will be established along sections of the perimeter of each target pest area where reinvasion pressure is likely greatest. Flipping Timmy traps with bait station toxin (either Contrac (Bromadiolone) or Double Trap and/or cyanide-based toxins such as Feratox Strikers will be used.

- Stoat, rat and hedgehog control using a trap network of single-set DOC 200 traps at 100 m spacings established around the perimeter of the lizard relocation site/s. A combination of lures will be used including Erayz dried rabbit meat, fresh eggs, salmon terracotta lure.
- Mouse control using a 25 m x 25 m bait station grid with Cholecalciferol based (or equivalent) poison will be used.
- An adaptive management approach will be necessary to allow flexibility for methods and toxins. Toxins may need to be alternated periodically for possums and rats to reduce bait shyness and trap aversion.
- Pest monitoring will be undertaken using trap-catch and bait take data.

10.9.7 Monitoring and reporting

10.9.7.1 Salvage and relocation programme reporting

Outcomes of the salvage and relocation programme will be reported to DOC for WA purposes. Lizard capture and relocation data will be compiled, summarised and submitted to DOC's national lizard database annually. The report will include the following information:

- A summary of species, numbers and age classes and sex of lizards captured.
- Locations of lizards captured and relocated.
- Summary of salvage methodologies, effort and success.
- Completion of Amphibian/Reptile Distribution Scheme (ARDS) Cards will also be submitted to DOC.

10.9.7.2 Post-release pest and lizard monitoring

Principle 7 of DOC's key principles of lizard salvage and transfer (DOC, 2019) recommends post-release monitoring to evaluate success of salvage operations. The purpose of the monitoring is to:

- Determine lizard population persistence.
- Monitor survival of enhancement plantings.
- Monitor pest mammal presence at the lizard relocation site/s.

Post-release lizard monitoring will commence the year following Project completion and be undertaken for a period of **five years**. Monitoring will be undertaken by a suitably experienced ecologist to determine presence and relative abundance of lizards across the relocation site/s.

Annual monitoring will consist of a mark-recapture live trapping survey and manual searching survey over one week during fine weather between November and February. Any captured lizards will be temporarily marked with a reptile-safe pen (xylene-free marker pen or similar) to easily establish duplicate catches and to allow a density estimate to be calculated. Identification photos will be taken of each individual showing the side, dorsal and ventral surfaces to identify relocated individuals.

11 Project location

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

The Project area applicable to this Wildlife Approval (WA) is shown in Figure 1.1 and Figure 1 Appendix A. Figure 1.1 also includes areas addressed under WAC 119946-FAU for clarity. The map series in Appendix A shows detailed maps of the different sections of the Project area.

GPS co-ordinates of the centre of the Project area are:

- 172.6751244°E
- 43.3482830°S

12 Authorisation for holding and relocating lizards

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

Authorisation is sought to temporarily hold and relocate lizards, in accordance with the methods described in Section 10.8.

13 Actual and potential effects & effects management

(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:

and;

(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):

The proposed activity applicable to this WA application is to **salvage and relocate** lizards from suitable habitat identified in the Package 2 Project area and to undertake **post release monitoring** in relocation site/s. Potential effects or risks of this activity, and measures to minimise these are provided in Section 13.1 to 13.3.

13.1 Potential effects of salvage and relocation activities on lizards

There are several potential ecological and welfare risks associated with lizard capture, salvage and relocation as a management tool for mitigation purposes. Potential risks include:

- Poor capture rates.
- Accidental injury or death of lizards during salvage works and vegetation removal.
- Stress, injury or death during transportation to relocation site/s.
- Disorientation of salvaged lizards after relocation, lack of shelter, increased movement and exposure.
- Vulnerability to weather extremes, temperature fluctuations, reproductive impacts.
- Competition for resources with resident lizards at relocation site/s.
- Predation at relocation site/s.
- Displacement, disturbance, injury or death of lizards unable to be salvaged.

13.2 Potential effects of monitoring on lizards

Post-release monitoring will require lizards to be captured so they can be marked allowing individuals to be identified. Potential risks include:

- Predation of lizards in live traps.
- Stress, injury or death during handling.

13.3 Methods to minimise potential adverse effects on lizards

Several methods will be applied to minimise potential adverse effects on lizards during the proposed salvage and relocation programme. Lizard habitat loss will be minimised by delineating and demarcating lizard salvage areas ahead of salvage works and vegetation/habitat clearance. Where practicable, at the discretion of the Project Lead Herpetologist, silt fencing will be installed to prevent lizards homing back to the vegetation clearance areas.

Poor capture rates for lizards during salvage works will be managed by maximising lead in time for pre-clearance salvage, using a flexible range of best practice salvage methods (see Section 10.8), and works will be undertaken to minimise lizard stress by appropriately experienced ecologists. Lizard salvage and relocation activities will occur in optimal weather conditions (section 10.2) and transportation and release of lizards will be undertaken in accordance with best-practice methods (Section 10.8).

A range of measures will be applied to enhance lizard habitat conditions at the relocation site/s to improve the overall quantity and quality of habitat, provide additional refuge and food resources for existing and released lizards (minimising competition), provide greater protection from predators and increase carrying capacity (Section 10.9). These will include:

- Pest plant control.
- Enhancement planting and maintenance.
- Habitat enhancement to increase lizard shelter and refugia.
- Pest mammal management.

Post-release lizard and pest mammal monitoring will be undertaken to determine population persistence, survival of enhancement plantings and pest mammal presence at the lizard relocation site/s. An overview of the relocation site habitat enhancement and preparation requirements is provided in Section 10.9.6 with specific details, maintenance and monitoring requirements to be detailed in the Project LMP.

Any lizards that are unable to be salvaged from lizard habitat within the Project area may disperse into adjacent habitat outside of the Project area. For any lizards detected within the Project area that are unable to be formally salvaged or unable to disperse into adjacent habitat, incidental discovery protocols will be followed (see Section 10.7).

14 Convictions under Wildlife Act 1953

(I) 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](#):

No such convictions have occurred.

15 Charges under Wildlife Act 1953

(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 such charges have occurred or are pending.

16 Proof of consultation

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

Pre-lodgement consultation with Gen Hewett (DOC) and Jacqui Wairepo (Kukuwai Consulting Ltd. acting as Technical Advisor on behalf of DOC) was undertaken on Friday 29 August 2025.

NZTA issued a pre-lodgement consultation pack to DOC on 5 September 2025, and written feedback was received from DOC on 22 September 2025. This feedback has been considered and how this has informed the Project is summarised in section 5.4 of the SAR.

17 Additional supporting documentation

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

This application has been prepared by Dr Liz Curry and Dr Jamie MacKay, on behalf of NZTA. Both Dr Curry and Dr MacKay are Principal and Senior Terrestrial Ecologists respectively, and have relevant experience and knowledge gained from other large-scale land development, roading and infrastructure projects.

Although this report has not been prepared for an Environment Court hearing, the authors confirm they each have read and agree to comply with the Code of Conduct for Expert Witnesses in the Environment Court Practice Note 2023.

As part of the FTAA application for the Project associated with this Wildlife Approval application, Dr MacKay also prepared the EclA (T+T, 2025) for terrestrial ecology matters, which was peer reviewed by Dr Curry. The EclA contains relevant detail and background information pertaining to the overall Project, detailed assessment of effects and management requirements for all ecological values. This report, along with the factual lizard survey report prepared by Wildlands herpetologist Ms Samantha King (Wildlands, 2025a; Appendix D), WAC 119946-FAU and associated Lizard Management Plan (Wildlands, 2025b), should be referred to alongside this application.

18 Applicability

This report has been prepared for the exclusive use of our client NZTA, with respect to the particular brief given to us and it may not be relied upon in other contexts or for any other purpose, or by any person other than our client, without our prior written agreement.

We understand and agree that NZTA will submit this report as part of an application under the Fast-track Approvals Act 2024 and the appointed panel will use this report for the purpose of assessing that application.

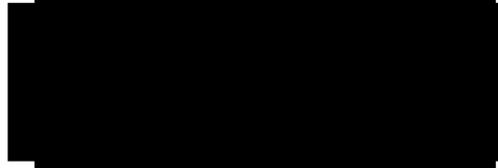
This report has been prepared in accordance with our sub consultancy agreement “Belfast to Pegasus Motorway & Woodend Bypass pre-implementation & MSQA Professional services contract number 11320”, dated 20 May 2025.

Report prepared by:



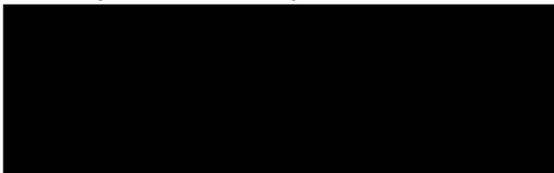
Senior Ecologist

Authorised for Tonkin & Taylor Ltd by:



Chris Perks
Project Director

Report reviewed by:



Dr Liz Curry
Technical Director – Terrestrial Ecology

LC

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19 References

Department of Conservation Lizard Technical Advisory Group. (2018). Guidelines and model for producing management plans for New Zealand lizards. Department of Conservation, PO Box 10 420, Wellington 6143, New Zealand.

Department of Conservation. (2019). Key principles for lizard salvage and transfer in New Zealand. Department of Conservation.

Department of Conservation (2023). Reducing the impacts of development on New Zealand lizards. Department of Conservation Lizard Technical Advisory Group.

Hare, K. (2012a). *Department of Conservation inventory and monitoring toolbox: Herpetofauna: Funnel trapping*. (DOCDM-783609.). Department of Conservation.

Hare, K. (2012b). *Department of Conservation Inventory and Monitoring Toolbox: Herpetofauna: Pitfall trapping*. (DOCDM-760240). Department of Conservation.

Hare, K. (2012c). *Department of Conservation Inventory and Monitoring Toolbox: Herpetofauna: Systematic searches*. (DOCDM-725787). Department of Conservation.

Herbert, S. M. (2020). *Is habitat enhancement a viable strategy for conserving New Zealand's endemic lizards?* Master's thesis, Victoria University of Wellington.

Herbert, S. M., Kelly, F. B. J., Panteleeva, E., Dean, S. M., Hartley, S., & Nelson, N. J. (2024). Short-term responses of terrestrial skinks to habitat enhancement in a pest-invaded landscape on mainland New Zealand. *New Zealand Journal of Zoology*.

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

Lettink, M. and Hare, K.M., (2016). Sampling techniques for New Zealand lizards. In *New Zealand Lizards* (pp. 269-291). Springer

McGee, K. (2023). *Urban lizard responses to habitat enhancement and predator control*. Master's thesis, Victoria University of Wellington.

Reardon, J. T., Whitaker, A. H., & Tocher, M. D. (2012). Predator control allows critically endangered lizards to recover on mainland New Zealand. *New Zealand Journal of Ecology*, 36(2), 141–150.

Roper-Lindsay, J., Fuller S.A., Hooson, S., Sanders, M.D., Ussher, G.T. (2018). Ecological Impact assessment. EIANZ guidelines for use in New Zealand: terrestrial and freshwater ecosystems. 2nd edition.

Tonkin & Taylor (2025). State Highway 1 North Canterbury – Woodend Bypass Project (Belfast to Pegasus) Ecological Impact Assessment (EclA) report.

Wildland Consultants. (2025a). Lizard Survey Report for State Highway 1, North Canterbury, Woodend Bypass Project (Belfast to Pegasus). Wildland Consultants Contract Report No. 7351e.

Wildland Consultants. (2025b). Lizard Management Plan for Belfast to Pegasus (Woodend Bypass) Road of National Significance – Early Works. Wildland Consultants Contract Report No. 7351a.

Woolley, C. (2021). *Conservation of endemic lizards in New Zealand cities*. Master's thesis, Victoria University of Wellington.

Appendix A Figures

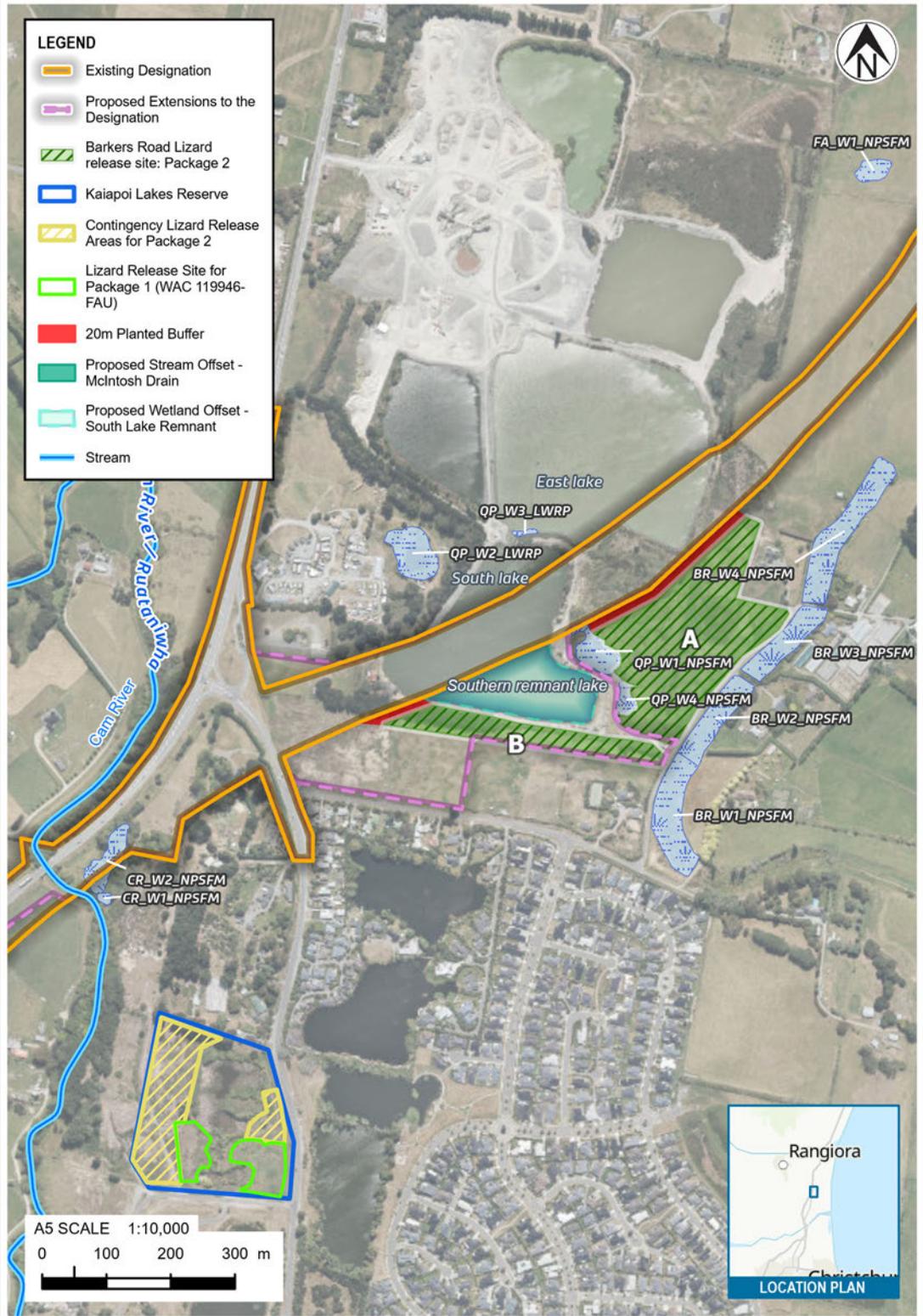
- **Figure 1. Lizard relocation sites.**
- **Figure 2. Lizard habitat and skink detections across the Project site.**

LEGEND

- Existing Designation
- Proposed Extensions to the Designation
- Barkers Road Lizard release site: Package 2
- Kaiapoi Lakes Reserve
- Contingency Lizard Release Areas for Package 2
- Lizard Release Site for Package 1 (WAC 119946-FAU)
- 20m Planted Buffer
- Proposed Stream Offset - McIntosh Drain
- Proposed Wetland Offset - South Lake Remnant
- Stream



FA_W1_NPSFM



A5 SCALE 1:10,000

0 100 200 300 m



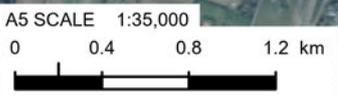
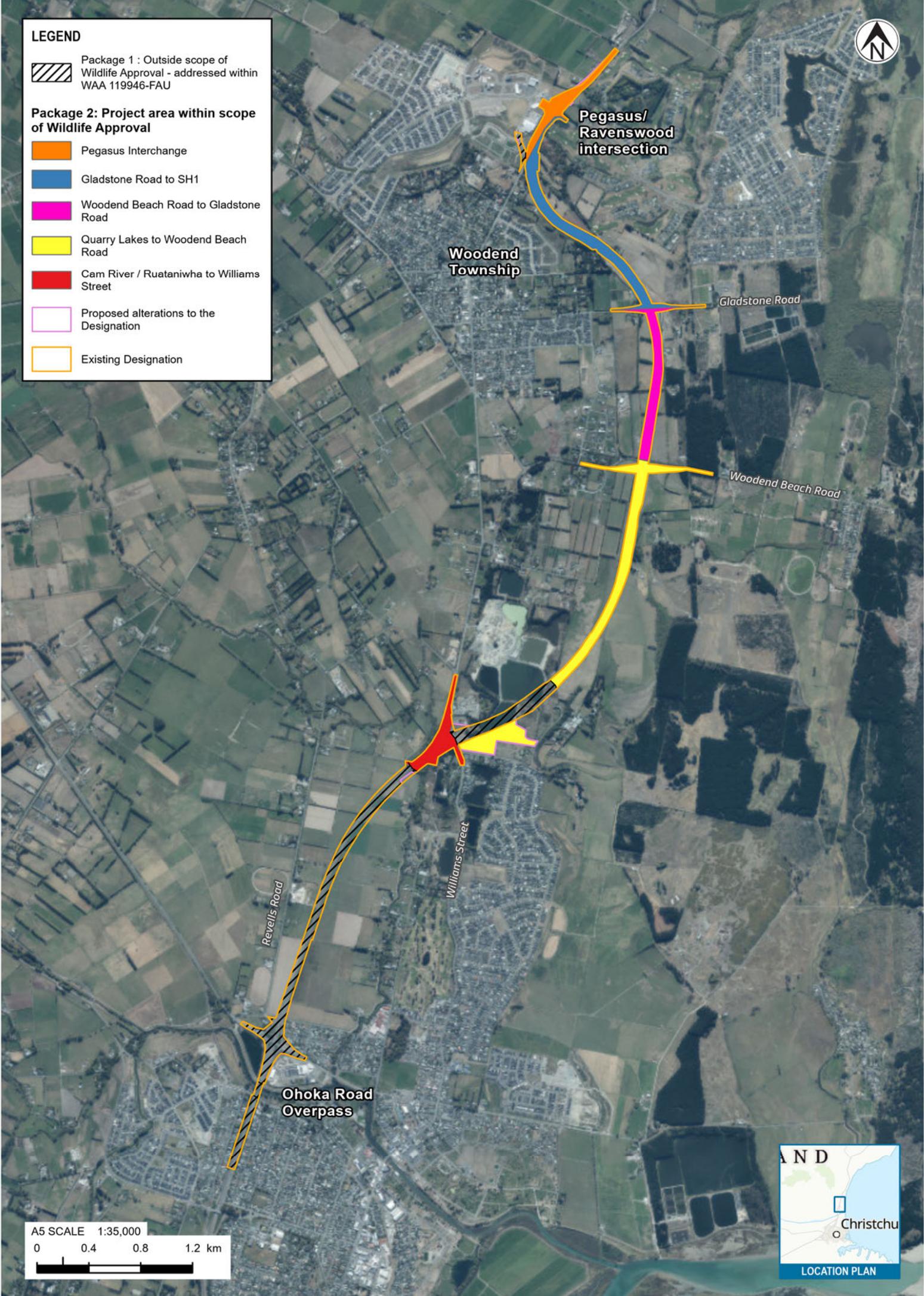
LOCATION PLAN

LEGEND

 Package 1 : Outside scope of Wildlife Approval - addressed within WAA 119946-FAU

Package 2: Project area within scope of Wildlife Approval

-  Pegasus Interchange
-  Gladstone Road to SH1
-  Woodend Beach Road to Gladstone Road
-  Quarry Lakes to Woodend Beach Road
-  Cam River / Ruataniwha to Williams Street
-  Proposed alterations to the Designation
-  Existing Designation



Appendix B Photos



Photograph Appendix B.1: Exotic grassland/scrub habitat. Taken on 10 April 2025.



Photograph Appendix B.2: Exotic treeland habitat. Taken on 19 May 2025.



Photograph Appendix B.3: Exotic shelterbelt habitat. Taken 05 May 2025.



Photograph Appendix B.4: Rank grass habitat. Taken 05 May 2025.



Photograph Appendix B.5: Indigenous plantings habitat. Taken 22 July 2025.



Photograph Appendix B.6: Debris piles habitat. Taken 21 May 2025.



Photograph Appendix B.7: Barkers Road Lizard Relocation site. Taken 19 August 2025.



Photograph Appendix B.8: Barkers Road Lizard Relocation site. Taken 19 August 2025.



Photograph Appendix B.9: Kaiapoi Lakes Lizard Relocation site Taken 19 August 2025.



Photograph Appendix B.10: Kaiapoi Lakes Lizard Relocation site Taken 19 August 2025.

Appendix C Key principles for lizard salvage

Appendix C Table 1: Key principles for lizard salvage and transfer (from Department of Conservation Lizard Technical Advisory Group, 2019)

Principle	Assessment
Lizard species' values and site significance must be assessed at both the development and receiving sites	Canterbury grass skinks (At Risk – Declining) and up to ~12.4 ha low-moderate habitat have been identified across Project area and are present at proposed relocation site/s (sections 7.1, 7.2 and 10.9).
Actual and potential development-related effects and their significance must be assessed	An EclA report has been prepared to support the SAR (T+T, 2025) and addresses actual and potential adverse effects associated with the development/Project.
Alternatives to moving lizards must be considered	Areas of lizard habitat to be removed will be refined where possible through project design, however the proposed bypass is considered essential infrastructure and as such habitat avoidance is not possible.
Threatened lizard species require more careful consideration than less-threatened species	No Threatened species have been detected or are likely to be on site.
Lizard salvage, transfer and release must use the best available methodology	Salvage and relocation methods proposed will be effective at salvaging and transferring lizards and are based on existing best-practice guidelines (section 10.8).
Receiving sites and their carrying capacity must be suitable in the long term	Based on habitat observations and proximity to known detections, Canterbury grass skink are likely present throughout the Barkers Road relocation site. Canterbury grass skink are confirmed present at the Kaiapoi Lakes Reserve site (section 10.9). The relocation site/s will be enhanced to increase carrying capacity and protection for relocated lizards through pest plant/weed control, enhancement planting, addition of woody debris/refugia and pest mammal control (section 10.9.6).
Monitoring is required to evaluate the salvage operation	Relocation site monitoring of lizards and pest mammals will be undertaken to determine success of salvage and relocation programme, enhancement planting survival and pest mammal presence (section 10.9.7).
Reporting is required to communicate outcomes of salvage operations and encourage process improvements	Reporting will be required to DOC (section 10.9.7).
Contingency actions are required when lizard salvage and transfer activities fail	Adaptive management measures will be applied during the salvage and relocation programme and an incidental discovery protocol will be implemented during works (section 10.7). In the event greater than 1,500 lizards are salvaged from the Project area, an additional 'spill-over' relocation site is proposed at the Kaiapoi Lakes Reserve, as a contingency measure (section 10.9.2).

Lizard Survey Report for State Highway 1, North Canterbury, Woodend Bypass Project (Belfast to Pegasus)

Contract Report No. 7351e

Providing outstanding ecological
services to sustain and improve
our environments



Lizard Survey Report for State Highway 1, North Canterbury, Woodend Bypass Project (Belfast to Pegasus)

Contract Report No. 7351e

September 2025

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Wildland Consultants Ltd
08/09/2025



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1.0 Introduction

State Highway 1 (SH1), from Belfast to Pegasus, is the key freight route to and from Christchurch and provides critical access to Christchurch City. Woodend, Pegasus and Ravenswood are experiencing significant growth, which has led to high traffic volumes, which in turn has led to delays and safety concerns. This growth is expected to continue; therefore, the State Highway 1 North Canterbury – Woodend Bypass Project (Belfast to Pegasus; the Project) has been prioritised by the New Zealand Transport Agency Waka Kotahi (NZTA) for delivery as a Road of National Significance (RONS). The total proposed length of the Project is c.10 kilometres, south of the Kaiapoi River Bridge and the Pegasus roundabout.

An initial habitat assessment of the Project was undertaken by Wildland Consultants Ltd (Wildlands) in October 2024. Targeted lizard surveys were then carried out between November 2024 and March 2025, under Wildlife Act Authority (WAA) 96003-FAU.

Targeted lizard surveys indicated that Canterbury grass skink (*Oligosoma aff. polychroma* Clade 4) were present within the Project footprint, confirming the presence of a lizard population. Construction of the Project is proposed by NZTA under the Fast Track Approvals Act (FTAA).

This report provides a comprehensive summary of the survey efforts and findings conducted across all sites within the Project footprint. Early investigation work is also required for the Project, and surveys for lizards as well as a separate Lizard Management Plan were prepared for the early works phase (Wildlands 2025). Early works lizard surveys and habitat assessments were undertaken during the same time as this main works assessment and the results are not included in this report.

2.0 Project Site and Context

2.1 Project context

The New Zealand Transport Agency Waka Kotahi proposes to construct, operate, and maintain the State Highway 1 North Canterbury – Woodend Bypass Project (Belfast to Pegasus).

The Project is an extension of the Christchurch Northern Motorway and will provide four lanes of grade-separated motorway over an approximately 10 kilometre (km) length. The Project Site commences from approximately 600 metres (m) south of the Kaiapoi River Bridge and extends to approximately 700 m north of the Pegasus/Ravenwood intersection, including a bypass of Woodend township. Key features of the Project are shown in Figure 1 below.

The Project has the following components:

Existing SH1 Upgrades – Upgrade SH1 from approximately 600 m south of the Kaiapoi River Bridge to the Cam River (a total distance of approximately 3.5 km), including:

- a. **Additional southbound lane** – Between approximately 600 m south of the Kaiapoi River Bridge to the bridge itself. Note: The southbound lane extends beyond the Project Site to approximately 200 m south of the Ohoka Road Overpass, but these works are beyond the scope of the Project.
- b. **Kaiapoi River Bridge upgrades** – Seismic strengthening and widening to provide additional southbound lane. Note: Some strengthening works forms part of the Early Works consenting package.
- c. **Four-lane upgrades** – Upgrade the SH1 carriageway from two lanes to four lanes from Lineside Road Overpass to the Cam River.

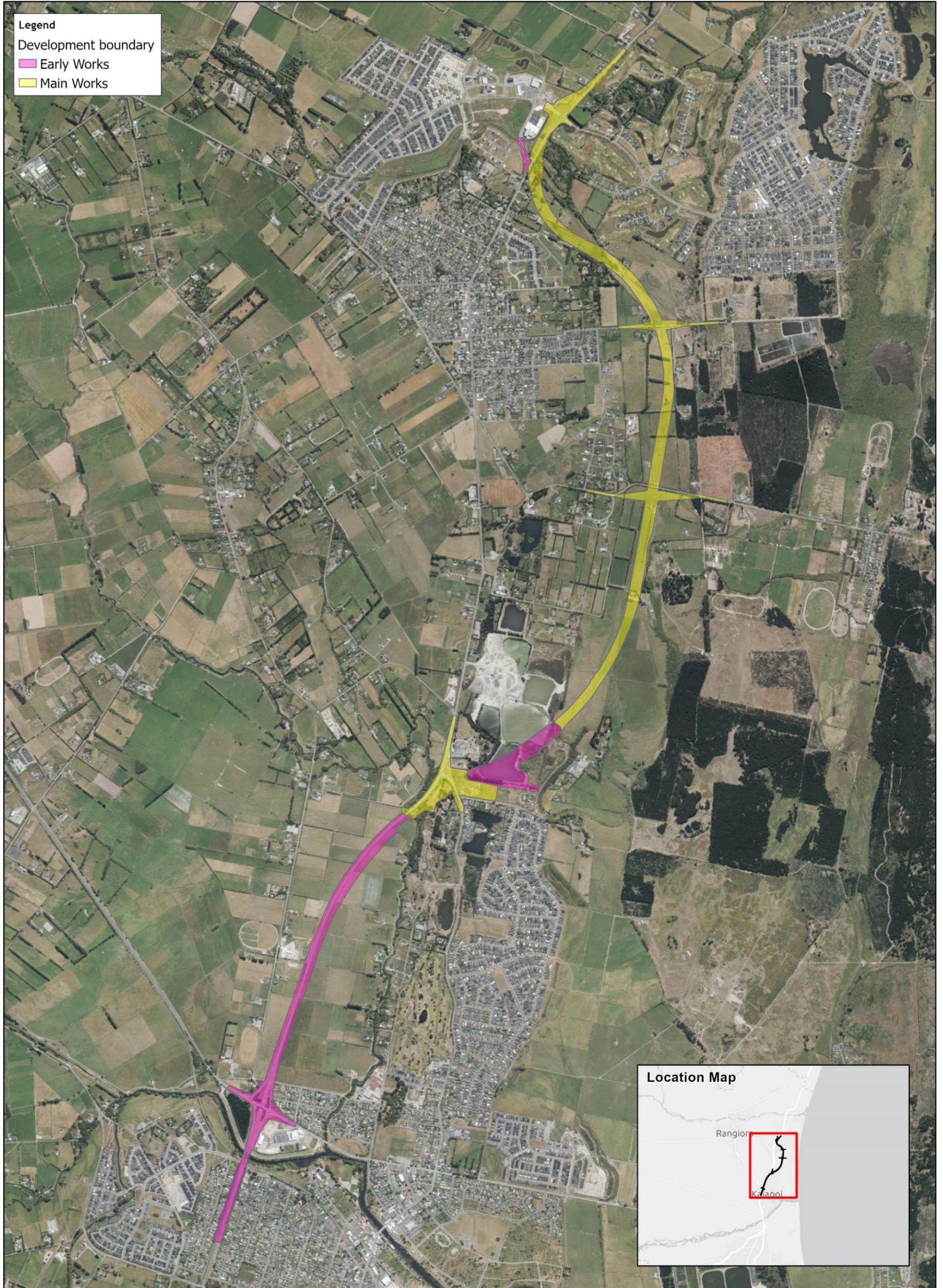


Woodend Bypass – A new four-lane motorway, bypassing Woodend township, from the Cam River to approximately 700 m north of the Pegasus/Ravenwood intersection (a total distance of approximately 7 km), including:

- a. **Cam River Bridge upgrades** – A new bridge to the east of the current bridge (SH1 and southbound on ramp). Note: these works integrate with the Williams Street interchange.
- b. **Williams Street interchange** – A new grade-separated diamond interchange overpass to the west of the existing roundabout (SH1 / Pegasus Boulevard / Bob Robertson Drive), including traffic signals and local road upgrades.
- c. **Quarry lakes embankment and southern remnant lake infilling** - A new tiered embankment through two artificial lakes (formed through quarrying), including dynamic compaction. The southern remnant lake created by the causeway will be partially filled and a wetland constructed in this area. Note: The initial (partial) reclamation is part of the Early Works consenting package.
- d. **Woodend Beach Road overbridge** – A new local road bridge over SH1, including a realignment of and upgrades to Woodend Beach Road.
- e. **Gladstone Road overbridge** – A new local road bridge over SH1, including upgrades to Gladstone Road.
- f. **Pegasus interchange** – Remove existing roundabout at the intersection of SH1/Pegasus Boulevard/Bob Robertson Drive and replace with a new grade-separated diamond interchange overpass, including traffic signals and local road upgrades. Including connection of Garlick Street to SH1.

2.2 Lizards

Lizards and their habitats were found throughout the Project footprint, including 13 properties and multiple areas of crown land across six habitat types. Lizard habitat quality has been categorised as low, medium and high, reflecting the relative densities of indigenous skinks present within each habitat.





3.0 Methods

3.1 Overview

A desktop assessment, review of relevant literature, habitat assessment and targeted lizard surveys were used to assess lizard values and population presence within the Project area. Results of surveys are presented in Section 4.

3.2 Desktop assessment

Department of Conservation BioWeb Herpetofauna Database observations within 10 kilometres of the site, and within the last 20 years, were assessed to provide context for lizard fauna recorded within the site and inform an assessment of ecological values for the project area.

3.3 Habitat assessment

An initial lizard habitat assessment was undertaken in October 2024, where lizard habitat was categorised during walkthrough habitat surveys.

3.4 Field surveys

Lizard survey methods were dependent on habitat quality and site access. Tracking tunnel, Artificial Cover Object (ACO) and funnel trap surveys were undertaken across the various habitat types listed in Table 1. Where possible, manual searching was undertaken to detect any additional lizards.

3.4.1 Tracking tunnels

Black Trakka standard tracking tunnels were placed at 25 metre spacings in selected representative habitats. Current best practice methodology for using tracking tunnels as a survey method for lizards is under development. Our methodology followed that of previous literature (Jarvie & Monks, 2014; Lettink *et al.*, 2022). The tunnels were set with Gotcha Traps tracking cards (low-viscosity ink) and baited with a Berry Bliss lolly (Natural Confectionary Co.TM, a known lizard attractant). The tracking tunnels were then left for c. two weeks before being collected.

3.4.2 ACOs

ACOs were placed in selected representative habitats at 5-25 metre spacings. The ACOs were left for 6-8 weeks before being checked. ACOs require a 'settling in period', so should be set up at least six weeks before the first check for lizards so that lizards become accustomed to them in the environment and start using them frequently (Lettink, 2012).

3.4.3 Funnel traps

Funnel trapping was undertaken at one site. Funnel traps were baited with berry bliss lollies. Funnel traps were padded with grass to provide shelter and prevent desiccation, in addition to preventing mice from preying upon captured skinks (as per the DOC Herpetofauna Monitoring Toolbox for Funnel Trapping; Hare, 2012). If mice were detected in a funnel trap where lizards were present, the mouse was euthanised on site and the trap was removed.



3.4.4 Manual searching

Where possible, manual searches were undertaken to locate lizards. This involved lifting and searching through natural and anthropogenic debris (e.g., wood, sticks, and farm equipment) and inspecting other habitats such as stumps and grassland habitats, following best practice guidelines (Hare, 2012).

3.4.5 Limitations of survey methods

Lizard survey methods sometimes have poor detection rates because of low population densities, species' cryptic colouration, difficulty in surveying preferred habitats and behaviour/activity patterns. As such, even intensive lizard surveys are unlikely to detect all individuals in the population or, possibly, all species present.

In large continuous habitats, equipment was placed at spacings of over 20 metres, to ensure a representative proportion of the site was surveyed. These spacings can only confirm presence of a lizard population, but may limit the overall understanding of species distribution (DOC, 2023). Tracking tunnel surveys can also provide information on the presence and activity of lizards, but do not provide accurate data on population abundance, nor do they allow the identification of species. Nevertheless, tracking tunnel surveys can be more effective at detecting lizard presence than standard trapping practices (Lettink *et al.*, 2022). This is especially important in areas with low-density populations.

4.0 Results

4.1 Desktop survey

The desktop survey retrieved records of four lizard species within 10 km of the Project (Table 1). Three of these species are considered unlikely, or highly unlikely, to be on-site. Canterbury grass skink was the only species considered to be present and this was confirmed during the surveys.

Table 1 – Results of the DOC Bioweb herpetofauna database search within a 10-kilometre radius of the Project and an assessment of the likelihood of the presence of these species within the Project area. Conservation status as per (Hitchmough *et al.*, 2021). The likelihood of occurrence for each species is given based on their known habitat preferences and distribution in the area and surrounds.

Species	Common Name	Conservation Status	Distance (km) and Year of Record	Preferred Habitats	Likelihood of Occurrence
<i>Oligosoma</i> aff. <i>polychroma</i> Clade 4	Canterbury grass skink	At Risk – Declining	6.7 (2022)	Range of grassy and rocky environments (from the coast to alpine)	Presence confirmed (through site survey)
<i>Oligosoma maccanni</i>	McCann's skink	Not Threatened	-	Open habitats- dry rocky environments such as rock outcrops, and montane grassland	Unlikely
<i>Woodworthia</i> c.f. <i>brunnea</i>	Waitaha gecko	At Risk – Declining	1.3 (2013)	Scrubland, forest, creviced rock outcrops, rocky scrubland, boulder beaches, river terraces, scree talus, and boulder field	Highly Unlikely



Species	Common Name	Conservation Status	Distance (km) and Year of Record	Preferred Habitats	Likelihood of Occurrence
<i>Oligosoma</i> aff. <i>polychroma</i> Clade 5	Southern grass skink	At Risk – Declining	8.1 (2023)	Prefers damp or well vegetated habitats such as rank grasslands, wetlands, stream/river edges, and gullies	Highly Unlikely

Canterbury grass skink are part of the grass skink complex, which has different clades that are found throughout the North and South Islands (Liggins *et al.*, 2008). Canterbury grass skink are found predominantly north of the Waimakariri River, and were confirmed present during site surveys. Canterbury grass skink are often found in modified environments where there is a range of grassy and/or rocky habitats (van Winkel *et al* 2018 & Purdie 2024).

Southern grass skink are only found south of the Waimakariri River (van Winkel *et al.*, 2018) and are therefore not considered to be present. McCann’s skink are abundant in Canterbury, but are typically found in more montane locations, as opposed to the lower plains where the Project is located.

Other species of indigenous lizard typically found in Canterbury (such as Waitaha gecko) are highly unlikely to be present. One observation of Waitaha gecko was recorded within 1.3 km of the Project, but it was observed in an old dwelling surrounded by mature vegetation, including trees and shrubs. Such areas can provide suitable habitat for relict populations of geckos to persist. However, no comparable habitat exists within the Project area, due to historic clearance and ongoing modification.

A high number of mammalian predators were detected during the lizard survey, further reducing the likelihood of Waitaha gecko persisting in this area (due to a lack of suitable contiguous protective refugia).

4.2 Lizard habitat

Six habitats have been determined across the Project area, each with varying quality levels. The Project will be permanent in nature and may affect up to c.13.73 hectares of lizard habitat. The area of habitat potentially affected, per habitat type, is displayed in Table 2. Properties where lizard habitats are present are listed in Table 3.

Table 2 – Lizard habitat to be affected within the Project area.

Habitat Type	Quality	Area Potentially Affected (ha)
Rank grass	Low	2.85
	Medium	6.07
Exotic shelterbelt	Low	0.27
	Medium	0.38
Blackberry/gorse/broom scrub	Medium	3.44
Pampas	Medium	0.03
Debris piles	Low	0.28
	Medium	0.34
Ornamental/domestic garden	Low	0.04
Potential habitat (TBD)	Low	0.03
Total		13.73

Table 3 – The habitat types and locations of habitats within the Project designation.

Habitat Type	Description	Location Present	
	<p>Areas of rank grass (cocksfoot etc.) that are frequently disturbed (through vehicle access, dumping or mowing) but still provide cover for lizards.</p> <p>These areas are likely to support a low-density population of lizards.</p>	<ul style="list-style-type: none"> - 130B Main North Road 	
<p>Rank grass</p>	<p>Undisturbed rank grass (cocksfoot, brown top etc.) habitats can be found along roadways, in unmaintained paddocks, and in association with soil bunds (in previous earth-worked sites). These areas are likely to support a medium-density of lizards – despite the size or extent of the habitat present.</p>	<ul style="list-style-type: none"> - 143 Old North Road - Crown land – Main North Road to Williams St intersection - 47 Barkers Road - Crownland – Woodend Beach Road - Crown land – Gladstone Road - 160 Gladstone Road - 162 Gladstone Road - 138 Main North Road - Crownland – After Pegasus Roundabout - 1188 Main North Road 	
	<p>Shelterbelts of exotic tree species (such as poplar (<i>Populus</i> sp.) and pine (<i>Pinus</i> sp.) that provide little to no cover are less suitable for skink occupation.</p> <p>These areas are therefore likely to support a low-density population of lizards.</p>	<ul style="list-style-type: none"> - 176 Woodend Beach Road - 167 Gladstone Road - Crown land – Gladstone Road 	
<p>Exotic shelterbelt</p>	<p>Shelterbelts of exotic tree species (such as willow (<i>Salix</i> sp.) and pine) in which rank grass or other debris provide suitable cover for skink occupation. These areas therefore likely to support a medium-density population of lizards.</p>	<ul style="list-style-type: none"> - 567 Williams Street - 167 Gladstone Road - 160 Gladstone Road - Crown land – Gladstone Road 	

Habitat Type	Description	Location Present	
Blackberry/gorse/broom scrub	<p>Either blackberry (<i>Rubus fruticosus</i> agg.), gorse (<i>Ulex europaeus</i>) or broom (<i>Cytisus scoparius</i>) or a combination of all three. These woody weeds provide complex shelter and cover which is likely to support a medium-density population of lizards.</p>	<ul style="list-style-type: none"> - 143 Old North Road - 47 Barkers Road - 167 Gladstone Road - 162 Gladstone Road - Crown land – Gladstone Road - 130B Main North Road - 138 Main North Road 	
Pampas	<p>Pampas grass provides shelter for lizards and is likely to support a high-density population of lizards.</p>	<ul style="list-style-type: none"> - 167 Gladstone Road 	
Debris piles	<p>Debris piles can consist of piled vegetation such as wood, or may consist of anthropogenic debris such as discarded farm machinery.</p> <p>When the piles are small and or sparse, they are likely to support a low-density population of lizards.</p>	<ul style="list-style-type: none"> - 162 Gladstone Road - 130B Main North Road - 1188 Main North Road 	
	<p>Debris piles can consist of piled vegetation such as wood, or may consist of anthropogenic debris such as discarded farm equipment/machinery.</p> <p>When the piles are larger or more frequent, they are likely to support a medium-density population of lizards</p>	<ul style="list-style-type: none"> - 567 Williams Street - 143 Old North Road - 167 Gladstone Road - 160 Gladstone Road - 138 Main North Road 	
Ornamental domestic garden, native amenity planting	<p>Some exotic and/or native species of plants (<i>agapanthus</i> sp., tussocks, cabbage trees (<i>Cordyline australis</i>) etc.) that are commonly found in ornamental/domestic gardens and amenity plantings.</p> <p>May provide suitable cover for a low-density population of lizards, especially where rank grass, or ground cover has established.</p>	<ul style="list-style-type: none"> - 145 Gladstone Road - 160 Gladstone Road 	



4.3 Lizard surveys

During surveys across the Project, 39 Canterbury grass skinks were captured and 95 were observed but not captured (Table 4). None of the captured skinks were recaptured on subsequent survey days, which can indicate a high number of skinks within a population. Uncaptured skinks were too active, were disturbed on approach to the ACOs, or were seen running *in situ*. It is likely that some of the skinks that were not captured may have been seen on multiple occasions.

Skinks were detected in 41 out of 128 tracking tunnels (32%) throughout the Project area. Tracking cards showed evidence of pest mammal presence, including mice (68%), rats (14.8%) and hedgehogs (33.6%). Evidence of mice occupying funnel traps and ACOs was found throughout the surveys. Areas where mice were particularly prevalent included 162 Gladstone Road, 47 Bakers Road, 143 Old North Road, 567 Williams Street and 130B Main North Road.

Skinks were detected at all but two sites where habitat was identified (Crownland - Kaiapoi Offramp and 1 Fullers Road).

Survey results for locations are summarised in Table 4 and Figure 2a-e. Early Works results have not been included in Table 4 but are summarised in Appendix 1.

Table 4 – Lizard survey results summary. Table includes all methods and lizards detected between 2024-2025.

Date	Location	Habitat Quality	Survey Method	Effort	Results
4-17 Dec 2024	176 Woodend Beach Road	Low	Tracking tunnels	16 tunnels	Skinks detected in 4 tracking tunnels (25%)
	Crownland - After Pegasus roundabout	Medium	Tracking tunnels	33 tunnels	Skinks detected in 9 tracking tunnels (27.27%)
5-17 Dec 2024	Crownland - Kaiapoi overbridge	N/A	Tracking tunnels	8 tunnels	No lizards detected
9-27 Jan 2025	Crownland – Gladstone Road	Medium and Low	Tracking tunnels	42 tunnels	Skinks detected in 26 tracking tunnels (61.9%)
27-31 Jan 2025	Crownland - Main North Road to Williams Street intersection	Medium	ACOs	116 checks	5 Canterbury grass skink sighted
	567 Williams Street	Medium	ACOs Manual searches	50 checks 0.5 p/hr	1 Canterbury grass skink caught (& 1 recapture) 6 Canterbury grass skink sighted
	143 Old North Road	Medium	ACOs	297 checks	9 Canterbury grass skink caught 16 Canterbury grass skink sighted
3-5 & 10 Feb 2025	1 Fullers Road	N/A	ACOs Manual searches	132 checks 0.5 p/hr	No lizards detected
	138 Main North Road	Medium	ACOs Manual searches	252 checks 2 p/hr	3 Canterbury grass skink caught 7 Canterbury grass skink sighted



Date	Location	Habitat Quality	Survey Method	Effort	Results
	130B Main North Road	Medium and Low	ACOs	221 checks	1 Canterbury grass skink sighted
18-20 & 25-26 Feb 2025	167 Gladstone Road	Medium	ACOs Manual searches	211 checks 0.5 p/hr	5 Canterbury grass skink caught 12 Canterbury grass skink sighted
	Crownland – Woodend Beach Road	Medium	ACO	104 checks	3 Canterbury grass skink sighted
10-12 Mar 2025	162 Gladstone Road	Medium and Low	Funnel traps Manual searches	60 checks 0.5 p/hr	9 Canterbury grass skink caught
10-11 & 13-14 Mar 2025	47 Barkers Road	Medium	ACOs	280 checks	6 Canterbury grass skink sighted
	145 Gladstone Road	Low	ACOs	45 checks	1 Canterbury grass skink caught
	1188 Main North Road	Medium and Low	ACOs	138 checks 0.5 p/hr	8 Canterbury grass skink sighted
	160 Gladstone Road	Medium and Low	ACOs Manual searches	284 checks 2 p/hr	8 Canterbury grass skink caught 15 Canterbury grass skink sighted
Summary	14 private properties. 6 areas of crownland.	High, Medium and Low-quality habitat	ACOs Funnel traps Tracking tunnels Manual searching	2,593 ACO checks 60 funnel trap checks 161 tracking tunnels 6.5 p/hr	39 Canterbury grass skink caught 95 Canterbury grass skink sighted Skinks detected in 50 tracking tunnels

5.0 Summary

A variety of survey methods were used to detect the presence of lizards and their habitats throughout the Project area, and to predict the possibility of other populations or species present on-site. The Project spans a variety of highly modified lizard habitats that consist primarily of exotic vegetation, and range in quality from high to low. The area covered by the Project is known to support Canterbury grass skink populations.

Due to the presence and abundance of indigenous lizards, the Project requires a Wildlife Act Approval (WAA) under Schedule 7 of the Fast-track Approvals Act (2024) which includes approvals relating to the Wildlife Act (1953). All indigenous lizards are protected under the Wildlife Act (1953) and approval under the Schedule 7 of the FTAA must be obtained, before any indigenous lizard can be disturbed or relocated within the Project area (Schedule 7(2, 2, i)).



References

- Department of Conservation. (2023). *Reducing the impacts of development on New Zealand lizards, guidance for developers, consenting authorities and ecologists/herpetologists*. Department of Conservation, Wellington. <https://www.doc.govt.nz/globalassets/documents/about-doc/concessions-and-permits/wildlife-research-permits/guidance-on-impacts-of-vegetation-clearance-on-lizards-nz.pdf>
- Hare, K. (2012). *Department of Conservation inventory and monitoring toolbox: Herpetofauna: Systematic searches*. (DOCDM-725787). Department of Conservation, Wellington.
- Hitchmough, R. A., Barr, B., Knox, C., Lettink, M., Monks, J. M., Patterson, G. B., Reardon, J. T., van Winkel, D., Rolfe, J., & Michel, P. (2021). *Conservation status of New Zealand reptiles, 2021* (New Zealand Threat Classification Series 35, p. 27). Department of Conservation.
- Jarvie, S., & Monks, J. (2014). Step on it: Can footprints from tracking tunnels be used to identify lizard species? *New Zealand Journal of Zoology*, 41(3), 210–217. <https://doi.org/10.1080/03014223.2014.911753>
- Lettink, M. (2012). *Department of Conservation inventory and monitoring toolbox: Herpetofauna: Artificial retreats* (DOCDM-797638). Department of Conservation, Wellington.
- Lettink, M., Young, J., & Monks, J. M. (2022). Comparison of footprint tracking and pitfall trapping for detecting skinks. *New Zealand Journal of Ecology*, 46(2), 1–5.
- Liggins, L., Chapple, D. G., Daugherty, C. H., & Ritchie, P. A. (2008). A SINE of restricted gene flow across the Alpine Fault: phylogeography of the New Zealand common skink (*Oligosoma nigriplantare polychroma*). *Molecular Ecology*, 17(16), 3668–3683.
- Purdie, S. (2024). *A naturalist's guide to the reptiles and amphibians of New Zealand*. John Beaufoy Publishing.
- van Winkel, D., Baling, M., & Hitchmough, R. (2018). *Reptiles and amphibians of New Zealand: A field guide*. Auckland: Auckland University Press, 376 pp.
- Wildland Consultants. (2025). *Lizard management plan for Belfast to Pegasus (Woodend Bypass) road of national significance – early works*. New Zealand Transport Agency Waka Kotahi.



Appendix 1 Survey Effort of all Locations Within the Project

Table 6 – Lizard tracking tunnel survey results for the Project.

Location	Dates Set	Average High Temperature	Average Low Temperature	Activity and Effort	Number of Tunnels Where Lizards Were Detected
176 Woodend Beach Road	4-17 Dec 2024	23.6°C	11.2°C	16 tracking tunnels	4 (25%)
Crownland – Gladstone Road	9-27 Jan 2025	19.8°C	10.6°C	42 tracking tunnels	26 (61.9%)
Crownland - SH1 -Kaiapoi offramp to Cam River	5-17 Dec 2024	22.3°C	10.5°C	62 tracking tunnels	11 (17.7%)
Crownland - After Pegasus roundabout	4-17 Dec 2024	22.3°C	10.5°C	33 tracking tunnels	9 (27.27%)
Crownland - Kaiapoi overbridge	9-27 Jan 2025	19.8°C	10.6°C	8 tracking tunnels	No lizards detected

Table 8 – Lizard ACO survey results for the Project.

Location	Date	Weather on Survey Date	Activity and Effort	Species Detected
Crownland – Main North Road to Williams Street intersection	27 Jan 2025	Partly cloudy, 19.2°C, 54.1% r.h., 1.7km/h, 3/8 cloud cover - Sunny, warm, 23.9°C, calm, 52.5% r.h.	15 ACO checks	Nothing detected
	28 Jan 2025	Sunny, warm, 16.1°C, 62.3% r.h., 3/8 cloud cover, 1.1km/h - 18.5°C, 59.2% r.h., 2/8 cloud cover	26 ACO checks 1 ACO removed	1 Canterbury grass skink sighted
	29 Jan 2025	Overcast, warm, 19.8°C, 55.6% r.h., 2.7km/h, 7/8 cloud cover - 23.2°C, 52.8% r.h., calm	25 ACO checks	Nothing detected
	30 Jan 2025	Overcast, warm, 22.1°C, 51.2% r.h., 2.5km/h, 7/8 cloud cover - 24.3°C, 52.4% r.h., 1.3km/h	25 ACO checks	Nothing detected
	31 Jan 2025	Sunny, warm, 21.1°C, 66.2% r.h., 1.1km/h, 3/8 cloud cover - hot, 22.2°C, 57.0% r.h., 2.2km/h	25 ACO checks	4 Canterbury grass skink sighted



Location	Date	Weather on Survey Date	Activity and Effort	Species Detected
567 Williams Street	27 Jan 2025	Partly cloudy, 19.2°C, 54.1% r.h., 1.7km/h, 3/8 cloud cover - Sunny, warm, 23.9°C, calm, 52.5% r.h.	10 ACO checks	1 Canterbury grass skink sighted
	28 Jan 2025	Sunny, warm, 16.1°C, 62.3% r.h., 3/8 cloud cover, 1.1km/h - 18.5°C, 59.2% r.h., 2/8 cloud cover	10 ACO checks	1 Canterbury grass skink caught 2 Canterbury grass skink sighted
	29 Jan 2025	Overcast, warm, 19.8°C, 55.6% r.h., 2.7km/h, 7/8 cloud cover - 23.2°C, 52.8% r.h., calm	10 ACO checks	1 Canterbury grass skink sighted
	30 Jan 2025	Overcast, warm, 22.1°C, 51.2% r.h., 2.5km/h, 7/8 cloud cover - 24.3°C, 52.4% r.h., 1.3km/h	10 ACO checks	Nothing detected
	31 Jan 2025	Sunny, warm, 21.1°C, 66.2% r.h., 1.1km/h, 3/8 cloud cover - hot, 22.2°C, 57.0% r.h., 2.2km/h	10 ACO checks	2 Canterbury grass skink sighted
143 Old North Road	27 Jan 2025	Partly cloudy, 19.2°C, 54.1% r.h., 1.7km/h, 3/8 cloud cover - Sunny, warm, 23.9°C, calm, 52.5% r.h.	52 ACO checks	2 Canterbury grass skink caught 2 Canterbury grass skink sighted
	28 Jan 2025	Sunny, warm, 16.1°C, 62.3% r.h., 3/8 cloud cover, 1.1km/h - 18.5°C, 59.2% r.h., 2/8 cloud cover	62 ACO checks 1 ACO removed	3 Canterbury grass skink caught 4 Canterbury grass skink sighted
	29 Jan 2025	Overcast, warm, 19.8°C, 55.6% r.h., 2.7km/h, 7/8 cloud cover - 23.2°C, 52.8% r.h., calm	61 ACO checks	1 Canterbury grass skink caught 1 Canterbury grass skink sighted
	30 Jan 2025	Overcast, warm, 22.1°C, 51.2% r.h., 2.5km/h, 7/8 cloud cover - 24.3°C, 52.4% r.h., 1.3km/h	61 ACO checks	1 Canterbury grass skink caught 1 Canterbury grass skink sighted
	31 Jan 2025	Sunny, warm, 21.1°C, 66.2% r.h., 1.1km/h, 3/8 cloud cover - hot, 22.2°C, 57.0% r.h., 2.2km/h	61 ACO checks, all ACOs removed	2 Canterbury grass skink caught 8 Canterbury grass skink sighted
1 Fullers Road	3 Feb 2025	Sunny/fine, 22.0°C, calm, 55.2% r.h. – 24.0°C, 61.6%	33 ACO checks	Nothing detected
	4 Feb 2025	Overcast, 18.9°C, 65.9% r.h., light W wind - 21.1°C, 54.4% r.h., light S wind	33 ACO checks	Nothing detected
	5 Feb 2025	Overcast, 20.0°C, 61.0% r.h., calm - sunny, 23.4°C, 56.4%, 1/8 cloud cover	33 ACO checks	Nothing detected
	10 Feb 2025	Overcast, cool, 18.9°C, 74.1% r.h., light NE breeze - warm, 23.0°C, 63.4% r.h, calm/still	33 ACO checks	Nothing detected



Location	Date	Weather on Survey Date	Activity and Effort	Species Detected
138 Main North Road	3 Feb 2025	Sunny/fine, 22.0°C, calm, 55.2% r.h. – 24.0°C, 61.6%	63 ACO checks	3 Canterbury grass skink sighted
	4 Feb 2025	Overcast, 18.9°C, 65.9% r.h., Light W wind - 21.1°C, 54.4% r.h., light S wind	63 ACO checks	1 Canterbury grass skink caught 1 Canterbury grass skink sighted Scat detected
	5 Feb 2025	Overcast, 20.0°C, 61.0% r.h., calm - sunny, 23.4°C, 56.4%, 1/8 cloud cover	63 ACO checks	2 Canterbury grass skink caught 2 Canterbury grass skink sighted
	10 Feb 2025	Overcast, cool, 18.9°C, 74.1% r.h., light NE breeze - warm, 23.0°C, 63.4% r.h, calm/still	63 ACO checks	1 Canterbury grass skink sighted
130B Main North Road	3 Feb 2025	Sunny/fine, 22.0°C, calm, 55.2% r.h. – 24.0°C, 61.6%	50 ACO checks	Nothing detected
	4 Feb 2025	Overcast, 18.9°C, 65.9% r.h., Light W wind - 21.1°C, 54.4% r.h., light S wind	57 ACO checks	1 Canterbury grass skink sighted Scat detected
	5 Feb 2025	Overcast, 20.0°C, 61.0% r.h., calm - sunny, 23.4°C, 56.4%, 1/8 cloud cover	57 ACO checks	Nothing detected
	10 Feb 2025	Overcast, cool, 18.9°C, 74.1% r.h., light NE breeze - warm, 23.0°C, 63.4% r.h, calm	57 ACO checks	Nothing detected
167 Gladstone Road	18 Feb 2025	Partly cloudy, light N wind, 22.2°C, 75.8%r.h. - 25.6°C, 59.5% r.h.	53 ACO checks	1 Canterbury grass skink caught 3 Canterbury grass skink sighted
	19 Feb 2025	Sunny, calm, 22.4°C, 64.4%r.h. - 32.7°C, 37.5% r.h.	53 ACO checks	3 Canterbury grass skink caught 7 Canterbury grass skink sighted
	20 Feb 2025	Sunny, moderate E wind, 23.4°C, 68.5%r.h. - 27.4°C, 28.6% r.h.	53 ACO checks	2 Canterbury grass skink sighted
	25 Feb 2025	Sunny, light W wind, 25.0°C, 45.0%r.h. - 32.7°C, 37.5% r.h.	26 ACO checks	Nothing detected
	26 Feb 2025	Overcast, light rain, light S wind, 18.0°C, 76.0%r.h.	26 ACO checks	1 Canterbury grass skink caught
Crowland – Woodend Beach Road	18 Feb2025	Partly cloudy, light N wind, 22.2°C, 75.8%r.h. - 25.6°C, 59.5% r.h.	26 ACO checks	1 Canterbury grass skink sighted
	19 Feb2025	Sunny, calm, 22.4°C, 64.4%r.h. - 32.7°C, 37.5% r.h.	26 ACO checks	2 Canterbury grass skink sighted
	20 Feb2025	Sunny, moderate E wind, 23.4°C, 68.5%r.h. - 27.4°C, 28.6% r.h.	26 ACO checks	Skink scat detected
	25 Feb2025	Sunny, light W wind, 25.0°C, 45.0%r.h. - 32.7°C, 37.5% r.h.	26 ACO checks	Nothing detected



Location	Date	Weather on Survey Date	Activity and Effort	Species Detected
47 Barkers Road	10 Mar 2025	Partly cloudy, moderate E wind, 16.7°C, 66.2%r.h. - 20.7°C, 65.1% r.h.	56 ACO Checks	1 Canterbury grass skink sighted
	11 Mar 2025	Partly cloudy, calm, 19.5°C, 82.3%r.h. - 26.6°C, 50.3% r.h	56 ACO Checks	4 Canterbury grass skink sighted
	13 Mar 2025	Sunny, moderate E wind, 18.2°C, 53.2%r.h. - 22.6°C, 43.2% r.h	56 ACO Checks	1 Canterbury grass skink sighted Skink scat detected
	14 Mar 2025	Sunny, light E breeze, 18.3°C, 70.9% r.h. - 25.7°C, 52.7% r.h	56 ACO Checks	Nothing detected
49 Bakers Road	18-Feb-25	Partly cloudy, light N wind, 22.2°C, 75.8%r.h. - 25.6°C, 9.5% r.h.	30 ACO Checks	Nothing detected
	19-Feb-25	Sunny, calm, 22.4°C, 64.4%r.h. - 32.7°C, 37.5% r.h.	30 ACO Checks	2 Canterbury grass skink sighted
	20-Feb-25	Sunny, moderate E wind, 23.4°C, 68.5%r.h. - 27.4°C, 28.6% r.h.	30 ACO Checks	2 Canterbury grass skink sighted
	25-Feb-25	Sunny, light W wind, 25.0°C, 45.0%r.h. - 32.7°C, 37.5% r.h.	30 ACO Checks	3 Canterbury grass skink sighted
Ready Mix Concrete	18-Feb-25	Partly cloudy, light N wind, 22.2°C, 75.8%r.h. - 25.6°C, 59.5% r.h.	87 ACO Checks	2 Canterbury grass skink sighted
	19-Feb-25	Sunny, calm, 22.4°C, 64.4%r.h. - 32.7°C, 37.5% r.h.	89 ACO Checks	2 Canterbury grass skink sighted 1 Canterbury grass skink caught
	20-Feb-25	Sunny, moderate E wind, 23.4°C, 68.5%r.h. - 27.4°C, 28.6% r.h.	81 ACO Checks	1 Canterbury grass skink sighted
	21-Feb-25	Cool, partly cloudy, still/calm, 75% r.h., 19.2°C - overcast, warm, moderate SE wind, 61.0% r.h., 16.9°C	86 ACO Checks	4 Canterbury grass skink sighted 2 Canterbury grass skink caught
145 Gladstone Road	10 Mar 2025	Partly cloudy, moderate E wind, 16.7°C, 66.2%r.h. - 20.7°C, 65.1% r.h.	9 ACO checks	Nothing detected
	11 Mar 2025	Partly cloudy, calm, 19.5°C, 82.3%r.h. - 26.6°C, 50.3% r.h	9 ACO checks	Nothing detected
	13 Mar 2025	Sunny, moderate E wind, 18.2°C, 53.2%r.h. - 22.6°C, 43.2% r.h	9 ACO checks	1 Canterbury grass skink captured
	14 Mar 2025	Sunny, light E breeze, 18.3°C, 70.9% r.h. - 25.7°C, 52.7% r.h	9 ACO checks	Nothing detected
1188 Main North Road	10 Mar 2025	Partly cloudy, moderate E wind, 16.7°C, 66.2%r.h. - 20.7°C, 65.1% r.h.	33 ACO checks	3 Canterbury grass skink sighted
	11 Mar 2025	Partly cloudy, calm, 19.5°C, 82.3%r.h. - 26.6°C, 50.3% r.h	35 ACO checks	3 Canterbury grass skink sighted
	13 Mar 2025	Sunny, moderate E wind, 18.2°C, 53.2%r.h. - 22.6°C, 43.2% r.h	35 ACO checks	1 Canterbury grass skink sighted



Location	Date	Weather on Survey Date	Activity and Effort	Species Detected
	14 Mar 2025	Sunny, light E breeze, 18.3°C, 70.9% r.h. - 25.7°C, 52.7% r.h	35 ACO checks	1 Canterbury grass skink sighted
160 Gladstone Road	10 Mar 2025	Partly cloudy, moderate E wind, 16.7°C, 66.2% r.h. - 20.7°C, 65.1% r.h.	71 ACO checks	1 Canterbury grass skink caught 4 Canterbury grass skink sighted
	11 Mar 2025	Partly cloudy, calm, 19.5°C, 82.3% r.h. - 26.6°C, 50.3% r.h	71 ACO checks	1 Canterbury grass skink caught 2 Canterbury grass skink sighted Skink scat detected
	13 Mar 2025	Sunny, moderate E wind, 18.2°C, 53.2% r.h. - 22.6°C, 43.2% r.h	71 ACO checks	1 Canterbury grass skink caught 4 Canterbury grass skink sighted
	14 Mar 2025	Sunny, light E breeze, 18.3°C, 70.9% r.h. - 25.7°C, 52.7% r.h	71 ACO checks	5 Canterbury grass skink caught 5 Canterbury grass skink sighted

Table 9 – Lizard funnel trap survey results for the Project.

Location	Date	Weather on Survey Date	Activity and Effort	Species Detected
162 Gladstone Road	10 Mar 2025	Partly cloudy, moderate E wind, 16.7°C, 66.2% r.h. - 20.7°C, 65.1% r.h.	30 funnel traps set	
	11 Mar 2025	Partly cloudy, calm, 19.5°C, 82.3% r.h. - 26.6°C, 50.3% r.h.	30 funnel trap checks	6 Canterbury grass skink caught
	12 Mar 2025	Rain, overcast, strong S wind, 15.3°C, 78.5% r.h. - 15.4°C, 73.4% r.h.	30 funnel trap checks	3 Canterbury grass skink caught



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The logo consists of a stylized green leaf with a brown stem, enclosed within a white circle. Below the circle, the word "Wildlands" is written in a bold, white, sans-serif font.

