REPORT

Tonkin+Taylor

State Highway 1 North Canterbury – Woodend Bypass Project (Belfast to Pegasus)

Lizard Management Plan

Prepared for
Aurecon NZ Ltd
New Zealand Transport Agency Waka Kotahi (NZTA)

Prepared by
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Title: State Highway 1 North Canterbury – Woodend Bypass Project (Belfast to Pegasus) – Lizard Management Plan **NZTA Number: 11320-AUR-0350-PWI-EN-PLN-0010[C]**					
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Feb 26	Rev A	Draft for client review	S. Morgan L. Curry	J. MacKay	C. Perks
March 26	Rev B	Draft Lizard Management Plan for NZTA comment	S. Morgan L. Curry	J. MacKay	C. Perks
May 26	Rev C	Draft Lizard Management Plan responding to DOC feedback and findings from Early Works lizard salvage	J. MacKay	L. Curry	C. Perks
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Table of contents

Glossary and Acronyms/terms

Acronym/Term	Description
Package 1 activity	Catch alive, handle and liberate Canterbury grass skinks 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 Canterbury grass skinks from habitat within the Package 2 Project area, within the scope of this Lizard Management Plan as shown in Figure 1.1.
Construction Works	Those works necessary to construct and establish the Project, including: • Land disturbance and vegetation removal; • Bulk earthworks (including cut and fill activities); • Ground improvement works; • Establishment of bridges, culverts, drainage, stormwater treatment and disposal systems, noise mitigation features, and other structures; • Temporary construction yards, buildings, and laydown areas; • Temporary haul roads, access points, and traffic management; • Temporary drainage and erosion and sediment control measures; • Landscaping and planting; • Pavements and surfacing; • Road furniture and ancillary works; and • Site reinstatement and rehabilitation activities.
Early Works	The Kaiapoi Bridge strengthening and quarry lakes partial reclamation authorised under CRC261034, CRC230304, CRC230305, CRC230306, CRC230307 and RC255072.
Enabling Works	Those works preceding and supporting Construction Works, including: • Geotechnical, land, or archaeological investigations (including related access formation); • Environmental enabling works (including related access formation); • Protection and relocation of utilities and services; • Establishment of construction yards, laydown areas, offices, and fencing (including related access formation); and • Establishment of erosion and sediment control measures.
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 Lizard Management Plan, which includes the following sections (as shown in Figure 1.1): • Cam River / Ruataniwha to Willliams St. • Quarry Lakes – Woodend Beach Road. • Woodend Beach Road – Gladstone Road. • Gladstone Road – SH1. • Pegasus Interchange.

Acronym/Term	Description
Designation	As the context requires: • 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
ECan	Environment Canterbury
EcIA	Ecological Impact Assessment
FTAA	Fast-track Approvals Act
km	Kilometre
LMP	Lizard Management Plan
m	Metre
NZTA	New Zealand Transport Agency Waka Kotahi
HEP	Habitat Enhancement Plan
PMMP	Pest Mammal Management Plan
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
WA	Wildlife Approval
WAA	Wildlife Act Authority
WAC	Wildlife Approval Condition
WDC	Waimakariri District Council
Wildlands	Wildland Consultants Ltd, the contractor engaged by NZTA to undertake a lizard survey report for the Project area.

1 Introduction

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 is an extension of the Christchurch Northern Motorway and will provide four lanes of grade-separated motorway over approximately 11 kilometres (**km**). The purpose of the Project is to provide an efficient and reliable connection between Belfast and Pegasus, while delivering improved access, community safety and public health outcomes, and reduced severance.

The physical work commences 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 (Figure 1.1).

The Project includes the following components:

- Upgrades to Existing State Highway 1 (SH1) – Upgrade SH1 from approximately 600 m south of the Kaiapoi River Bridge to the Cam River/Ruataniwha (a total distance of approximately 4 km).
- Woodend Bypass – Construction of a new four-lane motorway, bypassing Woodend township, from the Cam River/Ruataniwha to approximately 700 m north of the Pegasus/Ravenwood intersection (a total distance of approximately 7 km).
- Project-wide features and activities applying at various locations along the entire length of the Project (a total distance of approximately 11 km).

A more comprehensive background and description of the Project is contained in the Substantive Application Report (**SAR**) that was prepared in support of an application for all necessary approvals under the Fast-track Approvals Act (**FTAA**).

Detailed ecological assessments of the Project site have been undertaken to inform the SAR (Wildlands, 2025a; Tonkin & Taylor Ltd (T+T), 2025a). Surveys confirmed that **Canterbury grass skink** (*Oligosoma* aff. *polychroma* Clade 4, At Risk-Declining) are present within the Project area. No other lizard species were detected during surveys and it is unlikely that any other lizard species are present. All indigenous lizards are protected under the Wildlife Act (1953), and appropriate management of Canterbury grass skink is therefore required.

1.1 Purpose and scope

A Wildlife Approval application report (T+T 2025b, Volume 3J SAR) has been prepared to inform the SAR and addresses specific requirements set out in Clause 2(1) of Schedule 7 of the FTAA. Proposed Wildlife Approval Condition (**WAC**) WA.2 (Volume 2E, SAR) requires the preparation of a Lizard Management Plan (**LMP**), that is to be submitted to the Department of Conservation (**DOC**) and Whitiora for review and comment before implementation. WA.2(b) notes the LMP may be prepared for the entirety of the Project or for individual Project stages, and WA.2(c) identifies the purpose of the LMP, being to reduce the injury and mortality of lizards during Construction Works and post-relocation monitoring.

Table 1.1 details the LMP requirements as set out in Condition WA.2 (dated 15 May 2026) and provides the section number(s) where these requirements are addressed in the LMP.

Table 1.1: WAC condition reference table

Condition	Requirement	Section within this report where addressed
WA.2 d)	i. Identification of suitable lizard habitats affected by construction works.	Section 2.2
	ii. Salvage methods to be undertaken before and during vegetation clearance, including protocols for transporting lizards to the Relocation Sites.	Section 3, 4, 5, and 7
	iii. Protocols for: Lizard hygiene management Incidental discovery Kill and harm minimisation Incidental death associated with salvage or construction works	1. Section 5.1 2. Section 10.2 3. Section3, 4, and 5.1 4. Section 10.1
	iv. Within the relocation site(s): 1 Measures for pest mammal control, creation, and enhancement of lizard habitat, and post-release lizard and pest mammal monitoring (monitoring to occur for a period of 5 years after establishment of relocation sites) and 2 Measures to avoid and minimise disturbance to resident lizards within the relocation sites associated with the measures in clause (1).	1. Section 6 and 7 2. Detailed in Appendix D and Appendix E
	v. (DELETED)	n/a
	vi. Evidence of the qualifications and experience for Personnel authorised to undertake the Activity.	Section 3.3, Appendix F
WA.3	The Authorised Activity shall be carried out: a) By personnel authorised to undertake the Activity; b) In accordance with the LMP; c) For Lizard capture, handling and relocation, this must only be undertaken between 1 October and 30 April when lizards are most active; d) d) For catch / capture, within the area affected by Construction Works on The Land, and for post-relocation monitoring purposes, catch / capture / liberate within the Relocation Sites.	This LMP
WA.4	The DOC Operations Manager for Mahaanui must be contacted immediately for further advice if lizard species that are not covered by this Approval are located within the footprint of the development or within the release site.	Section 10.2
WA.5	Capture and handling methods must involve only techniques that minimise the risk of	Section 5.1

Condition	Requirement	Section within this report where addressed
	infection or injury to the animal and must follow those described in the Herpetofauna inventory and monitoring toolbox http://www.doc.govt.nz/our-work/biodiversity-inventoryandmonitoring/herpetofauna/.	
WA.6	In addition to those personnel authorised to undertake the Authorised Activity, additional personnel may handle Lizards where the DOC Operations Manager for Mahaanui has agreed in writing. When seeking written agreement, the Approval Holder shall provide evidence of the additional person's relevant qualifications and experience.	Section 3.1
WA.7	If any lizards are found injured, the Lead Herpetologist must be contacted to get advice on management of the lizard. Injured lizard(s) may be euthanised on recommendation of the Lead Herpetologist or a veterinarian.	Section 10.1
WA.8	If any lizards die during the Authorised Activity, the Approval Holder must: i. Inform the DOC Operations Manager for Mahaanui (mahaanui@doc.govt.nz) within 48 hours, chill the body if it can be delivered within 72 hours, or freeze the body if delivery will take longer than 72 hours; and ii. Send the body to Massey University Wildlife Postmortem Service for necropsy or as otherwise advised by the Tauranga DOC Operations Manager, along with details of the animal's history; iii. Pay any costs incurred in investigation of the death of any lizard; and iv. If required by the DOC Operations Manager for Mahaanui, cease the Approved Activity for a period determined by the DOC Operations Manager.	Section 10.1
WA.9	A report is to be submitted in writing to the DOC Operations Manager for Mahaanui by 30 September each year (covering the proceeding 1 July – 30 June period) during the Authorised Activity; summarising outcomes, in accordance with the Lizard Management Plan. Each report must include: i. The Fast Track reference number	Section 8

Condition	Requirement	Section within this report where addressed
	ii. The number of any animals collected and released; iii. The GPS location (or a detailed map) of the collection point(s) and release point(s); iv. Results of all surveys, monitoring or research; iv. Details of habitat enhancement, predator control, and fencing;	
WA.10	This Approval gives the Approval Holder the right to hold absolutely protected wildlife for no longer than 12 hours in accordance with the terms and conditions of the Approval. All absolutely protected wildlife remains the property of the Crown. This includes any dead wildlife, live wildlife, any parts thereof, any eggs or progeny of the wildlife, genetic material and any replicated genetic material	Section 5.1
WA.11	The Approval Holder must review the LMP and resubmit it to the Director General for certification on or before the 10-year anniversary date of the Approval date. The objective of the review is to re-assess habitat conditions and characteristics and update the LMP to reflect current species knowledge, best practice lizard management and mitigation techniques.	Section 11

This LMP follows industry-standard guidance for preparing lizard management plans (DOC Lizard Technical Advisory Group, 2018), and key principles for lizard salvage (DOC Lizard Technical Advisory Group, 2019), as outlined in Appendix B.

For the purposes of the Wildlife Act 1953, the Project is split into two "packages" as summarised in Table 1.2 and Figure 1.1. The "early works" Wildlife Act Authority (WAA 119946-FAU) authorises activities within Package 1, being: Garlick Street, the early works area[1], and the area south of the Cam River/Ruataniwha. This LMP details lizard management requirements for the Package 2 area, entailing all construction works outside of that already authorised by the "early works" Wildlife Act Authority. This LMP includes the following:

- A description of the proposed Construction Works associated with Package 2 areas;
- A summary of lizard/habitat values and potential adverse effects;
- Effects management for lizards, including lizard salvage and relocation protocols;
- Approved personnel;
- Relocation site characteristics and location;
- Pest mammal control and habitat enhancement measures at relocation site/s;
- Lizard and pest mammal monitoring requirements;
- Reporting requirements;
- Adaptive management measures; and

[1] Subject to separate approval outside of the Fast-track Approvals Act process.

- Lizard Management Plan review requirements.

Figure 1.1 shows the applicable Project area. Areas not considered within the scope of this report (Package 1; WAA 119946-FAU and associated LMP; Wildlands 2025b), are also shown for clarity.

Table 1.2: Permits and approvals associated with Package 1 and Package 2 project works

Works area	Relevant Wildlife Act Permit	Other relevant consent approvals relating to LMP
Package 1 (works undertaken under WAA 119946-FAU and associated LMP)		
Early Works		
Early Works at Kaiapoi River Bridge	Not required	n/a
Early Works at Quarry Lakes	Wildlife Act Authority [WAA 119946-FAU]	Consent package CRC260604, CRC260605, CRC260606, and CRC260607
Construction works		
SH1 upgrades south the Cam River/Ruataniwha. Garlick Street.	Wildlife Act Authority [WAA 119946-FAU]	
Package 2 (works relevant to this LMP)		
Construction Works		
All remaining construction works	Wildlife Approval [WA TBC] –	Approvals being sought through FTAA process

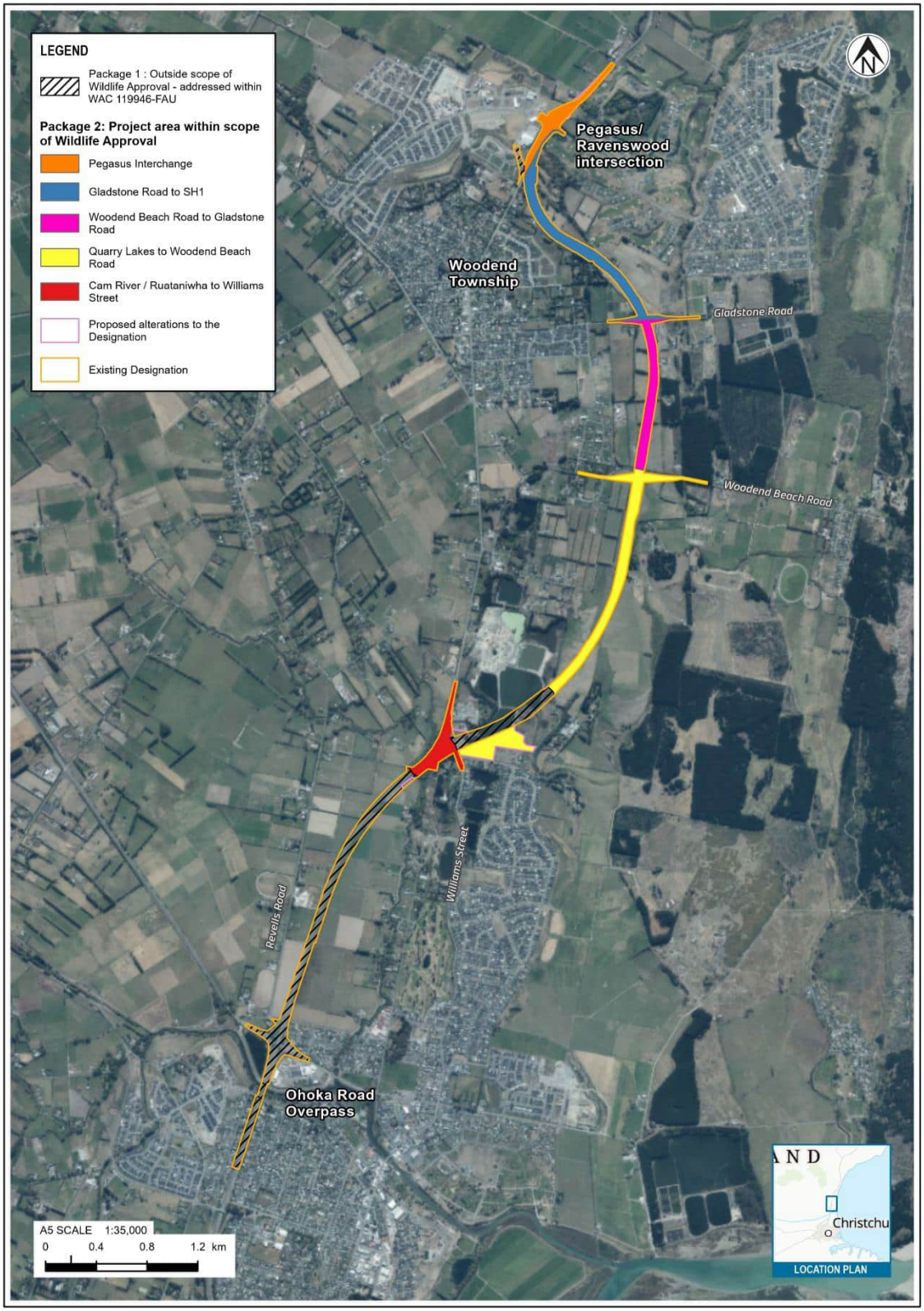


Figure 1.1: Project location and Project area applicable to the Wildlife Approval (WA) report. The figure also distinguishes areas covered by Package 1 and Package 2.

1.2 Roles and Responsibilities

Responsibilities of all parties involved in implementing the LMP are outlined in Table 1.3.

Table 1.3: Responsibilities of those implementing the LMP

Organisation (Title)	Contact	Responsibility
NZTA (Project Owner)	XXX	• Delivery of the Project, including compliance with any WAC [TBC] conditions.
NZTA or Main Contractor (Project Manager)	XXX	• Co-ordinates communication between the Project Owner, the Construction Contractor, the Restoration Contractor, and Project Herpetologist.
Main Contractor (Construction Site Manager)	XXX	• Delivery of and compliance with this LMP. • Implementation of the LMP including the following: – Reading and understanding the LMP. – Facilitating a project start-up meeting with the Project Ecologist(s) before construction commences. – Contacting the Project Herpetologist a minimum of one month before any potential lizard habitat areas are scheduled for clearance. – Maintaining clear lines of communication with the Project Herpetologist regarding changes to the works schedule. – Briefing new personnel about the contractor's responsibilities under this LMP.
XXX (Project Herpetologist)	XXX	The Project Herpetologist is a lead ecologist approved by DOC and named on the Project's WAC. They are to be engaged by the Project Owner to provide technical advice to the Main Contractor and assist the Project Manager in complying with this LMP. The Project Herpetologist will: • Read and understand the LMP. • Ensure any required permits are attained and on hand during survey works. • Ensure the relocation site preparation work is undertaken appropriately and suitable conditions achieved prior to lizard salvage works commencing.

Organisation (Title)	Contact	Responsibility
		• Lead required lizard salvage and relocation works. • Provide regular updates on lizard management to the Project Manager and Project Owner. • Complete any required reporting, including completion of Amphibian/Reptile Distribution Scheme (ARDS) Cards.
XXX (Project Ecologist(s))	XXX	• Project Ecologists includes the Project Herpetologist and all ecologists working under the supervision of the Project Herpetologist to support compliance with this LMP. Project Ecologists will be named on the WAC as a suitably qualified and experienced person.
XXX (Restoration Contractor(s))	XXX	• May be one or more contractors at the discretion of the Project Owner. • Delivery of, and compliance with the HEP (Appendix D). • Reading and understanding the HEP. • Communicating with Project Manager and the Project Herpetologist. • Communicating with the Project Herpetologist and Project Manager if any changes are required through the adaptive management process.
XXX (Pest Control Contractor(s))	XXX	• May be one or more contractors at the discretion of the Project Owner. • Delivery of, and compliance with, the PMMP (Appendix E). • Reading and understanding the PMMP. • Communicating with the Project Owner and the Project Herpetologist. • Communicating with the Project Herpetologist and Project Owner if any changes are required through the adaptive management process. • Briefing new personnel about responsibilities under the PMMP.
Department of Conservation (Regulator)		• Regulator inputs TBC upon receipt of Wildlife Approval (WA).

The Project Herpetologist will be suitably qualified and experienced for lizard salvage and relocation operations. A checklist of all activities covered by this LMP along with responsibilities is provided in Section 1.3. The listed activities must be carried out to the standard determined by the Project Herpetologist as necessary to achieve effective lizard management.

1.3 LMP implementation programme

The Construction Site Manager will inform the Project Herpetologist of an approximate vegetation clearance staging plan at least three months prior to works commencing. This will allow the project team to implement the LMP.

The Construction Site Manager will inform the Project Herpetologist at least one month prior to vegetation clearance and prior to any excavation works in areas that provide habitat for native lizards. Table 1.4 outlines the proposed programme for LMP implementation.

Preparation of the relocation site through implementation of the Habitat Enhancement Plan (**HEP**, See Appendix D) and Pest Mammal Management Plan (**PMMP**, see Appendix E) will commence at least three months prior to when lizard habitat removal is scheduled to occur. This will ensure that the benefits of habitat enhancement at the relocation site (i.e. increased food and shelter availability, reduced predation pressure) are achieved prior to relocated lizards being released.

Table 1.4: Lizard management implementation schedule for Package 2

Deliverables	Timeframe	Personnel	Completed
Project Start			
Package 2 Wildlife Approval obtained	Prior to works commencing	NZTA/DOC	
LMP consultation and certification	Prior to works commencing	NZTA/Whitiora/DOC	
Relocation site enhancement / preparation			
Pest mammal control set out	At least three months prior to lizard salvage works commencing, and continuing for five years from the date that the final lizard is relocated to each site.	Restoration Contractor	
Install rock piles for habitat enhancement	At least three months prior to lizard salvage works commencing.	Restoration contractor under supervision of Project Herpetologist.	
Pest plant control	Initial pest plant control will occur at least one month before enhancement planting. Maintenance pest plant control will be undertaken annually for five years (between October – April) from the date that the final lizard is relocated to each site. If lizard salvage and translocation activities occur over multiple seasons, pest plant maintenance will be undertaken outside of the lizard salvage season (Oct-April), to minimise impacts on recently translocated lizards.	Restoration Contractor	

Deliverables	Timeframe	Personnel	Completed
Enhancement planting	April – October, three months prior to project works commencing, and annually over the same period from the date that the final lizard is relocated to each site.	Restoration Contractor in conjunction with Project Herpetologist	
Buffer planting adjacent to relocation site	As per enhancement planting schedule.	Restoration Contractor	
Install wood piles for habitat enhancement	During vegetation clearance as appropriate logs become available.	Restoration Contractor under supervision from Project Herpetologist	
Stage 1: Pre-vegetation clearance lizard management (1 October – 30 April)			
Demarcation of lizard habitat areas to be retained and areas requiring pre-clearance management	Prior to project works commencing.	Construction Contractor in conjunction with Project Herpetologist	
Establish lizard silt fencing in works area (where practicable)	One week prior to project works commencing.	Construction Contractor in conjunction with Project Herpetologist	
Live trapping lizard salvage and relocation programme	Within two weeks prior to any habitat clearance.	Project Ecologist(s) under direction of Project Herpetologist	
Manual searching lizard salvage and relocation programme	Within two weeks prior to any habitat clearance.	Project Ecologist(s) under direction of Project Herpetologist	
Relocation site monitoring			
Lizard monitoring	Annually for five years following salvage completion.	Project Ecologist(s) under direction of Project Herpetologist	
Reporting			
Incident reporting (if required)	Completed within ten working days following salvaging incident.	Project Herpetologist	
Compliance reporting	Completed within 60 working days following salvaging completion each year.	Project Herpetologist	
Wildlife Approval reporting	Submitted by 30 September each year (covering the preceding 1 July-30 June period).	Project Herpetologist	

Deliverables	Timeframe	Personnel	Completed
Amphibian and Reptile Distribution Scheme (ARDS) Card	Completed within 30 working days following salvaging completion each year.	Project Herpetologist	
Annual monitoring reporting	Completed annually for five consecutive years following salvaging.	Project Herpetologist	

2 Summary of lizard ecological values, effects on lizards and effects management

Detailed information on the ecological values within the Project area, potential effects on lizards and proposed effects management measures is provided in the EcIA report (T+T, 2025a), Wildlife Approval report (T+T, 2025b) and summarised in the following sections.

2.1 Lizard species present

The lizard values within and adjacent to the project footprint were assessed through the following methods:

- **Desktop review:** Existing records from the DOC Herpetofauna Database within 10 km of the Project Site were reviewed to identify indigenous lizard species potentially present in the landscape in and around the Project Site, and to assess their likelihood of occurrence based on habitat and distribution.
- **Field assessment and surveys:** Wildlands undertook an initial habitat assessment (October 2024) followed by targeted lizard surveys (December 2024 – March 2025) using manual searches, tracking tunnels, funnel traps, and artificial cover objects. Work was carried out under WAA 96003-FAU.
- **Habitat mapping and verification:** Potential lizard habitat polygons were digitised by Wildlands using aerial imagery and survey data, and subsequently refined by T+T to align with updated aerial imagery and to incorporate contiguous habitat of the same type. Lizard habitat was ground-truthed by T+T during field visits in August 2025.

Desktop records show four indigenous lizard species within a 10 km radius of the Project Site (Table 2.1). Of these, Canterbury grass skink (*Oligosoma aff. polychroma* Clade 4, At Risk-Declining; Hitchmough et al. 2021) were considered most likely to be present (Wildlands, 2025a). The other three species are unlikely to be present based on distribution and/or habitat requirements (Wildlands, 2025a).

From the targeted lizard surveys undertaken by Wildlands, 134 Canterbury grass skinks were recorded across the broader Project Site (c.105 ha). Thirty-nine were captured, and 95 were observed during surveys. Skinks were also detected in 41 out of 128 tracking tunnels (32%). Lizard survey results across the broader Project Site are presented in Wildlands (2025a), and locations of skink detections (captures and observations) are shown in Appendix A. No other lizard species were captured or detected. As such, this LMP focusses solely on the management of Canterbury grass skink. In the unlikely event another species is discovered, all habitat clearance will stop and DOC will be notified as per the protocol outlined in Section 10.2.

Table 2.1: Native lizard species recorded within 10 km of the Project Site (DOC Herpetofauna Atlas, updated August 2024)

Species name	Common name	Threat classification (national) (Hitchmough *et al.*, 2021)	Ecological value (Roper-Lindsay et al. 2018)	Presence	Habitat use
Oligosoma polychroma Clade 4	Canterbury grass skink	At Risk – Declining	High	Confirmed	Wide range of habitat types from coastal to alpine zones, preferring open areas including coastal vegetation, rock piles, grassland, tussock, shrubland, screes, forest margins tussock and modified agricultural habitats.
Oligosoma maccanni	McCann's skink	Not Threatened	Moderate	Unlikely	Dry, open habitats including stony ground, tussock grassland, and scree from the lowlands up into subalpine regions.
Oligosoma polychroma Clade 5	Southern grass skink	At Risk – Declining	High	Highly unlikely	Coastal dune habitat, wetlands, grassland, shrublands, rocky shrubland, screes, tussock, stony riverbeds, and urban areas.
Woodowrthia cf. brunnea	Waitaha gecko	At Risk – Declining	High	Highly unlikely	Range of lowland habitats including rocky outcrops, bluffs, rock tumbles, scrubby vegetation, duneland, as well as forest trees.

Note: Following the EIANZ Ecological Impact Assessment guidelines (Roper-Lindsay *et al.*, 2018), the ecological value of each species was determined by assessing its regional and national threat classification. However, all native lizards are absolutely protected by the Wildlife Act 1953 regardless of ecological value.

2.2 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 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)

Discrete areas of woody organic and refuse debris piles are also present within the Project area and offer suitable lizard habitat. Detailed descriptions of lizard habitat types and lizard habitat values within the Project area are provided in the Wildlife Approval Application report (T+T 2025b).

The 12.4 ha habitat loss figure is a conservative estimate based on full site clearance within the Project Designation; and the actual scale of habitat loss will be lower than this as construction works are unlikely to require the full Designation extent.

Lizard habitat types, area, value and locations within the Project area are summarised in Table 2.2 and Figure 1, Appendix A.

Table 2.2: Lizard habitat types, value and locations within the Package 2 Project area

Section of the Project Site	Habitat type	Area (ha)	Habitat value (in accordance with section 5.7 of EcIA report (T+T 2025a) and EcIAG[2])	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

[2] Ecological Impact Assessment Guidelines (EcIAG) 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.

Section of the Project Site	Habitat type	Area (ha)	Habitat value (in accordance with section 5.7 of EcIA report (T+T 2025a) and EcIAG[2])	Lizards confirmed present (based on Wildlands 2025a surveys)
	Exotic shrubland and grassland mosaic	3.2	Moderate	Y
	Exotic treeland	1.7	Low	Y
	Rank grass	0.9	Low	Y
Pegasus Interchange	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)**	

2.3 Potential effects on lizards

Potential adverse effects of the Project on lizards include:

- **Habitat loss due to vegetation clearance:** Removal of rank grass, exotic treeland, and exotic grassland/scrub mosaic vegetation will directly reduce available refuge and foraging sites.
- **Construction-related stress, injury or mortality:** Lizards may be at risk of injury or mortality during vegetation clearance and earthworks if not detected and successfully relocated. Prolonged exposure to construction-related noise, vibration, and dust may temporarily deter lizards from nearby habitats or reduce their activity levels.
- **Stress, injury or mortality during transportation to relocation site:** The act of salvaging and relocating lizards will likely result in stress effects on individuals, and increased risk of injury and mortality.
- **Displacement into sub-optimal habitat:** Lizards may move into surrounding areas where food and shelter are limited or where populations are already at carrying capacity, increasing competition and predation risk.
- **Reduced survival and breeding success:** Displaced individuals may experience lower survival and reproductive output due to reduced food availability, loss of protective cover, increased predation, and competition with resident lizards.

2.4 Lizard effects management

Efforts to reduce adverse ecological effects have been undertaken though the optioneering and concept design phases of the project to avoid or minimise lizard habitat loss where practicable. However, vegetation and habitat removal will still be required and potential adverse ecological effects will be avoided, remedied, or mitigated through the following measures:

- Further minimisation and refinement of vegetation/habitat loss through appropriate site preparation and staging of vegetation removal (Section 3.1).
- Lizard salvage prior to and during vegetation/habitat clearance (Section 3.2 and Section 4).
- Lizard relocation to suitable nearby site/s (Section 5).

- Habitat enhancement measures at lizard relocation site/s comprising native planting, habitat/refugia enhancement, pest plant control, and pest mammal control (Section 6).
- Post-relocation lizard monitoring at relocation site/s (Section 7).

The lizard salvage and relocation programme will be implemented over two stages:

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

It is anticipated that lizard salvage will take place over at least two seasons.

3 Stage 1: Pre-vegetation clearance works

3.1 Site preparation and staging

Unnecessary lizard habitat loss within the Project Area prior to and during construction will be avoided through ongoing site management and an appropriate construction methodology.

A minimum of one month prior to commencement of any vegetation clearance, the extent of vegetation to be removed and to be retained will be demarcated and agreed with the Project Herpetologist. Efforts will be made to minimise the loss of potential lizard habitat to the extent practicable. Site marking will be used to identify and protect 'no go' zones (areas to be avoided during construction activities).

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

Site compounds and vehicle parking areas shall be in places that lack suitable habitat for lizards.

Two weeks prior to clearance works, suitably experienced ecologist(s) under the guidance of the Project Herpetologist will implement search and salvage methods (Section 3.2) to search for lizards in all identified lizard habitat to be removed (Appendix A).

Vegetation clearance will likely be completed over multiple seasons. 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 Section 3.6.

Prior to commencement of any vegetation clearance activities or construction, pre-start meetings will be held with the Construction Site Manager, Project Herpetologist and other relevant parties to discuss requirements for lizard habitat removal detailed in this LMP. All parties must review and understand this LMP.

3.2 Lizard salvaging protocols

Pre-clearance lizard salvage is proposed to prevent mortality or injury to lizards during vegetation clearance and earthworks. Protocols for lizard salvaging and relocation specified below are consistent with industry standard methodologies and are commonly used on construction projects. The methodologies have been adapted for local site conditions and habitat types. A flexible approach using a toolbox of best-practice methods is proposed to be used at the Project Herpetologist's discretion depending on lizard micro-habitats and quality of lizard habitat within the Project area.

Proposed protocols are consistent with best-practice methodologies from DOC's Inventory and Monitoring Toolbox: Herpetofauna (Hare 2012a,b,c; Lettink 2012), sampling techniques for New Zealand lizards (Lettink and Hare, 2016) and DOC's nine key principles for lizard salvage and transfer in New Zealand (DOC 2019). Appendix B Table 1 outlines how each principle is addressed by this LMP.

To improve salvage and relocation success rates, the following measures are proposed:

- 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 (Section 3.6).
- Lizard salvage and relocation activities will occur in suitable weather conditions (Section 3.5) and transportation and release of lizards will be undertaken in accordance with best-practice methods (Section 5).

3.3 Personnel

The lizard salvage and relocation programme will be undertaken by the personnel named in Table 3.1. All personnel are suitably experienced in lizard handling, including salvage and relocation operations, and will be named on the WAC permit to capture, handle, and relocate protected native lizards.

In addition to the personnel named in Table 3.1, additional personnel may undertake lizard salvage and relocation where the DOC Operations Manager for Mahaanui has agreed in writing. When seeking written agreement, evidence of the additional person's relevant qualifications and experience will be provided.

A Whitiora representative shall be invited to attend and assist a qualified ecologist with any lizard salvage and relocation operations.

Biographies for the personnel named in Table 3.1 are provided in Appendix F.

Table 3.1: Personnel authorised to undertake lizard salvage and liberation

Role	Name
Lead Herpetologist	Dr Rieke Behrens
	David Pickett
	Dr Christopher Woolley
	Sam Heggie Gracie
Other herpetologists	Dr Liz Curry
	Dr Jamie MacKay
	Nicki van Zyl
	Sam Mulcock
	Shaun Morgan
	Ashleigh Johnston
	Dr Tarryn Wyman
	Josh Forrest
Personnel under the supervision of the Lead Herpetologist	Cid Shearman
	Bex Diederichson
	Matt Barson
	Pippa McAnergney
	Tyler Eaton-Palmer
	Paul Dyer
	Danielle Cairns
	Laura Francis

3.4 Salvaging footprint

The area of habitat clearance shall be clearly marked prior to clearance during the site preparation stage (Section 3.1). This will ensure lizard salvage will be undertaken within appropriate areas. Lizard habitats include those listed in Section 2.2 and shown in Figure 1 Appendix A.

3.5 Timing and weather conditions

Salvage will only be undertaken between 1 October and 30 April when lizards are most active. Salvage will only be undertaken in accordance with suitable weather requirements as defined below:

- Minimum average temperatures of 10°C for night-time salvaging, and 12°C for daytime salvaging.
- Maximum temperature of 25°C.
- Light winds and no rain heavier than 0.1 -2 mm per hour (light drizzle).

Current and forecasted weather data including temperature, precipitation, and wind speed will be obtained from the Weather Underground station 'Tuahiwi Weather Station 1 - IKAIAP38' located between Kaiapoi and Woodend.

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, the pre-clearance salvage efforts will need to recommence at the discretion of the Project Herpetologist.

3.6 Live trapping

Prior to vegetation clearance, a combination of 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 1, Appendix A), as deemed appropriate by the Project Herpetologist. Funnel traps should be used with caution, as high mouse densities were detected during previous surveys and during early works salvage (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 the Project 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 Herpetologist.

3.6.1.1 Pitfall trap establishment

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.

3.6.1.2 Funnel trap establishment

Funnel traps will be baited with canned pear (or other suitable bait) and padded with grass to provide shelter, prevent desiccation, and reduce the risk of 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).

3.6.1.3 Trap spacing

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 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.

3.6.1.4 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'. Funnel traps will be set the day before monitoring commences.

To prevent harm to lizards, all 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 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. Additional trapping will be limited to traps within a 50 m area around traps where lizards are caught. Beyond the additional three days, if lizards are still being caught in these traps, further trapping will be undertaken at the Project Herpetologist's discretion.

All native lizards will be released at a pre-determined relocation site (see Section 5.3) the same day as capture.

3.7 Systematic manual salvage

Systematic daytime manual salvage techniques will be applied in conjunction 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. course woody debris and branches) present within the lizard salvage areas will be moved to the relocation site for habitat enhancement purposes (see Section 5.3). Search effort will be determined by the Project 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.

3.8 Salvage effort summary

Table 3.2: 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 for the full Project area: 830.	If lizards 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. Beyond this, if lizards are still being caught, further trapping will be at the direction of the Project Herpetologist.
	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 for the full Project area: 410 (at 10 m spacings) Increase to 5 x 5 m spacings in discrete areas of dense lizard habitat.	
Systematic manual salvage	Low (up to ~8.3 ha) Moderate (up to ~4.1 ha)	At discretion of Project 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

3.9 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.
- Note: SVL, weight and/or photographs will not be measured if an individual appears stressed. Stressed individuals will be immediately released to the relocation site.

4 Stage 2: Clearance works

Once the Project 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 can commence (Stage 2).

Vegetation clearance will occur **within one week** of the Stage 1 salvage works, to ensure that lizards do not disperse into these areas. If vegetation clearance does not occur within one week, further trapping or systematic searching may be required at the discretion of the Project Herpetologist.

Following vegetation / habitat clearance, where practicable, contractors should remove vegetation from the site immediately following clearance. If vegetation cannot be removed from the site immediately after clearance, it should be stockpiled in an area well away from any adjoining lizard habitat, under the direction of the Project Herpetologist. Vegetation should be mulched or removed from the stockpile site within one week to prevent lizards from colonising.

5 Relocation protocols

5.1 Capture, handling and transport

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

- All field equipment that 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, 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 twelve hours of capture, will be checked for any signs of stress or illness and released into rock or log piles within the relocation area. No more than 15 lizards will be released into a single rock or log pile.

5.2 Lizard salvage estimates

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 (2025b) for Package 1 of the Project (WAA 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 (applicable to this LMP) has been derived as follows:

Low value habitat: ~8.3 ha x 77 = ~640 lizards

Moderate value habitat: ~4.1 ha x 150 = ~615 lizards (Higher salvage numbers are anticipated in moderate value habitat vs. low value habitat).

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

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 construction methodology 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 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 LMP).

5.3 Lizard relocation sites

5.3.1 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 6[3] 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.

Other aspects considered included:

- Minimising the distance between the relocation site and the original population.
- Potential to enhance the relocation site/s through the establishment of suitable native vegetation, refugia and pest mammal control to increase lizard carrying capacity.

Following this process, a relocation site was identified on Barkers Road. The location of the relocation site is shown in Figure 5.1 with representative photographs provided in Figure 1 Appendix A.

Up to 1,500 salvaged lizards can be released at this site.

5.3.2 Barkers Road relocation site

A ~6 ha parcel of Crown land across several titles (Lot 1 DP 423296, Lot 2 DP 423296, Lot 1 DP 359788, and Lot 2 DP 359788) on Barkers Road (Figure 5.1) will serve as the **primary relocation site** for the Package 2 works. A portion of the Barkers Road relocation site was surveyed using Artificial Cover Objects (ACOs) between December 2024 and March 2025 (Wildlands 2025a) and presence of Canterbury grass skink was confirmed.

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 C.7 and C.8, Appendix C). 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 used for salvage for Package 1. 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 5.1).

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

- 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 5.1). 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.
- The ~6ha area will be divided into two portions ('A' and 'B'). Portion A (~4 ha) will be used as the initial lizard relocation site at Barkers Road. 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 C. An assessment of site suitability against DOC's key principles for lizard salvage and transfer (DOC, 2019) is provided in Appendix B.

Summaries of pest control and habitat enhancement measures at the relocation site/s are provided in Section 6, and specific management plans have been prepared and are provided in Appendix D and Appendix E. Monitoring and reporting requirements are detailed in Section 7.

5.3.3 Contingencies

As outlined above, lizard capture numbers will be reviewed at the end of each salvage season and capture estimates for the upcoming season calculated. If it is anticipated that greater than 1,500 lizards will be captured, the following contingencies will be put into place:

- 1,501-1,750 lizards – add 50 additional habitat features (i.e. rock piles and log stacks) to the Barkers Road release site.
- 1,750-2,000 lizards – increase duration of pest mammal control and post-release monitoring at the Barkers Road release site by an additional 5 years (10 years in total).
- Greater than 2,000 lizards – establish additional relocation site (see below).

An additional parcel of Crown land further north on Barkers Road (Lot 3 DP 423296) has been identified as a potential additional relocation site should one be required. The area is connected to the main lizard release site and is approximately ~2 ha in size. The contingency lizard release site is shown in Figure 6.1. If required, the site will undergo the same habitat enhancement and preparation as the main Barkers Road release site, as detailed in Section 6.

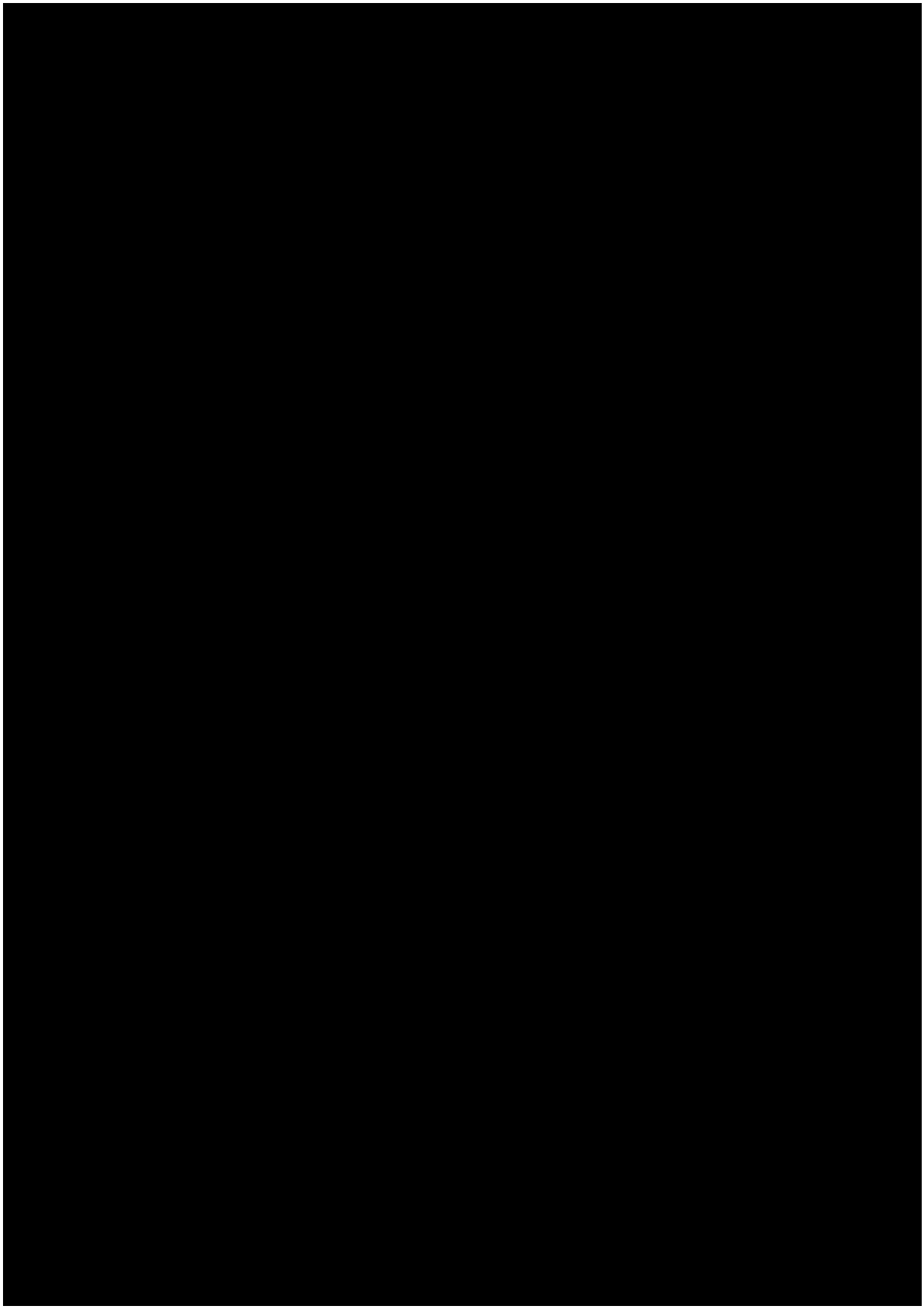


Figure 5.1: Lizard relocation sites.

6 Relocation site habitat enhancement and pest control measures

Pest control and enhancement measures proposed at the Barkers Road relocation site will include:

- Enhancement planting.
- Pest plant control.
- 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 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.

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. Initial pest plant control and enhancement planting will be ideally 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; October - April). However, this timeframe may be extended if preparation of the lizard release site is required over winter months prior to any lizard salvage and translocation activities. **Initial pest animal control and addition of lizard habitat/refugia will commence a minimum of three months prior to any lizard release**. This will ensure that the carrying capacity of the relocation site is increased before salvaged lizards are released, minimising the risk of adverse impacts on resident lizards through competition.

A Habitat Enhancement Plan (**HEP**) detailing the habitat enhancement measures including planting establishment, pest plant management, and refugia placement is provided in the Appendix D. A Pest Mammal Management Plan (**PMMP**) is provided in Appendix E. Summaries of these management plans are provided in the following sections.

Canterbury grass skink have been confirmed present at the relocation site and habitat enhancement measures outlined in the HEP and PMMP contain guidance on how to avoid or minimise impacts on the resident population of lizards during works.

6.1 Enhancement planting and maintenance

The lizard relocation sites will be planted with “lizard friendly” plantings (Table 6.1) to be consistent with those recommended for Package 1 under WAC 119946-FAU. The relocation sites will be fenced using stock-proof fencing to protect plantings. For the avoidance of doubt, no predator fencing is proposed.

Enhancement planting will be undertaken to provide protective benefits for lizards at the relocation site. The proposed planting measures are consistent with Department of Conservation (DOC, 2023) guidance and are designed to ensure food availability, shelter, basking opportunities, and protection from predators. Planting will create a mosaic of discrete patches of planting within a matrix of existing exotic grass providing varied microhabitats.

The Project Herpetologist will direct and supervise the Restoration Contractor to implement the HEP provided in Appendix D. Planting will be carried out by a Restoration Contractor in accordance with the planting schedule and specifications included in the HEP. Plant species to be utilised at the relocation sites are presented in Table 6.1 in addition to benefits to lizards.

Planting will be carried out during the main planting season May and October (inclusive), when soil moisture is sufficient and prior to any lizard salvage, to reduce disturbance following release. Monitoring will be undertaken between October and April to identify infill planting requirements in concurrence with pest plant monitoring for five years following the final release of lizards at each relocation site. If plant loss exceeds 10%, infill planting using species from the approved palette will be undertaken between the following May to September, as directed by the Restoration Contractor.

Table 6.1: Lizard-friendly planting palette to be utilised at the lizard relocation sites

Species	Common name	Benefits to lizards
Austroderia richardii	South Island toe toe	C, R, I
Carex buchananii	Buchanan's sedge	C, I
Carmichaelia australis	New Zealand broom	C, I
Coprosma acerosa	Sand coprosma	C, N, F, I
Coprosma crassifolia	Mingimingi	C, N, F, I
Coprosma propinqua var. propinqua	Mingimingi	C, N, F, I
Cordyline australis	Ti kouka | Cabbage tree	R, F
Festuca novae-zelandiae	Fescue tussock	C, I
Melicytus alpinus	Porcupine shrub	C, R, N, F
Muehlenbeckia astonii	Pohehue	C, R, N, F
Muehlenbeckia axillaris	Creeping pōhuehue	C, R, N, F
Ozothamnus leptophyllus	Tauhinu	C
Poa cita	Pātītī | Silver tussock	C, I
Pomaderris amoena	Tauhinu	C, R
Sophora prostrata	Prostrate kōwhai	C, R, F
Teucrium parvifolium	Teucridium	C, R

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

6.2 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 Restoration Contractor to determine the presence and extent of the pest plant species, as per the Appendix D HEP. The findings of this assessment will guide the selection of appropriate control methods and the scale of implementation required.

Initial pest plant control (prior to commencement of any lizard salvage and translocation activities) will ideally 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; October - April). However, this timeframe may be extended if site preparation is required over winter months. Pest plants will be

controlled by hand as much as possible, with herbicides used only when there is no other option to minimise potential adverse effects on resident lizards. All control measures using herbicides 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. Ideally pest plant control will be completed at least one month before enhancement planting activities.

Maintenance pest plant control will be carried out for five years, and will be undertaken between October to April). If the lizard salvage and translocation programme runs over multiple seasons, to ensure that recently translocated lizards are not impacted by weed control activities, maintenance pest plant control will occur outside of the October to April lizard salvage period.

Further details are provided in the HEP in Appendix D.

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 rock and log piles. Approximately 300 rock and log piles will be installed.

The selection and placement of rock and log piles will be supervised by the Project Ecologist to ensure that appropriate habitat items are selected and placed correctly, and to ensure that disturbance to the site is minimised. Habitat /refugia enhancement will be implemented prior to lizard salvage and release at each relocation site, with ongoing maintenance continuing for five years. Habitat features will be interspersed with discrete areas of planting within a matrix of exotic grasses to provide a range of microhabitats suitable for feeding, basking, and protection from predators.

Further details are provided in the HEP in Appendix D.

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 the final release of lizards at each individual relocation site. Details of pest mammal control and monitoring to be undertaken at the lizard relocation sites is provided in a Pest Mammal Management Plan (PMMP) in Appendix E. The PMMP may be subject to change based on Pest Control Contractor requirements. A summary of key management measures include:

- Pest mammal management will utilise trapping and bait stations to control potential mammalian predators of lizards. Management will initially be undertaken following monthly cycles, with frequency modifications made depending on the results from trapping and the level of bait take within bait stations.
- Rats and mice controlled using a 25 m × 25 m lockable ground-based bait station grid network or clusters within lizard relocation sites, with bait stations established along sections of the perimeter of each target pest area where reinvasion pressure is likely greatest. Toxins will initially include a combination of brodifacoum and diphacinone.
- Stoat, rat and hedgehog control using a trap network alternating between single-set DOC 200 and DOC 250 traps at 100 m spacings established around the perimeter of the lizard relocation sites. A combination of lures will be used which may include Erayz dried rabbit meat, fresh eggs, or infused terracotta lures.

- 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.
- Annual reporting to DOC including details of the pest control undertaken during the annual monitoring period and any changes made from the previous year, and recommendations for changes to the programme to improve performance.

7 Post-relocation lizard monitoring and reporting

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.

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

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. Pitfall and funnel traps will be established within the relocation site/s in accordance with the methodologies detailed in Section 3.6. Pitfall and funnel traps will be spaced 5-10 m apart in grid formation (where feasible) in areas of suitable habitat. 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'. Funnel traps will be set the day before monitoring commences. To prevent harm to lizards, all traps will be closed and deactivated when not in use and during poor weather conditions.

Traps will be checked daily (every 24 hours) over a minimum 4-night trapping period (consecutive nights). Any identified lizards will be temporarily marked with a reptile-safe pen (xylene-free marker pen or similar) to easily establish duplicate catches. Identification photos will be taken of each individual showing the side, dorsal and ventral surfaces to identify relocated individuals.

The ratio and distribution of pitfall traps and funnel traps established for post-relocation monitoring will be at the discretion of the Project Herpetologist based on conditions at the relocation sites, but should remain consistent between annual monitoring rounds where possible.

8 Reporting

8.1 Salvage and relocation programme reporting

A compliance report covering the preceding 1 July-30 June period will be prepared and submitted to DOC annually, by 30 September. Lizard capture and relocation data will be compiled, summarised and submitted to DOC's national lizard database annually.

The report will summarise outcomes in accordance with this LMP, and shall include the following:

- The Fast Track reference number.
- The number of any animals collected and released.
- The GPS location and a detailed map of the salvage and release locations.
- Results of all surveys, monitoring, or research.
- Details of habitat enhancement, predator control, and fencing.

Completed Amphibian/Reptile Distribution Scheme (ARDS) Cards will also be submitted to DOC.

8.2 Post-relocation lizard monitoring reporting

Results from annual post-relocation lizard monitoring will be prepared by the Project Herpetologist and incorporated into the annual report (see Section 8.1). The reports will provide a summary of the survey methods, weather data during the monitoring period, a summary of the survey results, and any adaptive management measures taken (see Section 10).

9 Adaptive management measures

To achieve the best outcomes for lizards, changes may need to be made to this LMP. If post-relocation lizard monitoring shows a decline in capture rates after the first three years of monitoring, management interventions will be considered improve outcomes for lizards. This may include increasing or modifying pest mammal and plant control, undertaking further habitat enhancement (e.g. additional planting or deposition of woody debris and logs), and/or making changes to the site layout to, for example, create additional open areas.

These interventions will be determined in consultation between the Project Herpetologist, NZTA and DOC, on an as required basis, based on follow up monitoring in the shoulder season (i.e. October or March), and a review of the success of pest mammal/plant control and habitat enhancement measures. Additional adaptive management measures are also detailed in the HEP provided in Appendix D and the PMMP provided in Appendix E.

The rationale behind any adaptive management changes must be based on robust management techniques consistent with DOC guidelines and only following confirmation from the Project Herpetologist. Any changes to the LMP will also require confirmation with DOC.

10 Incidental discovery protocols

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 Herpetologist and description of location, size, colour patterns and habitat it was observed provided.
- Contractors must carry and/or keep a hard sided container with air holes (such as an ice cream container) on site at all times, in case of lizard discovery.
- 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 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 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.

10.1 Accidental injury and/or mortality of native lizards

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

- In the event an injured lizard is discovered, the Project Lead Herpetologist will consider the survivability, determine appropriate steps, and undertake activities including euthanasia, if warranted. Consultation with DOC may be necessary.
- If required, injured lizards found during salvage may 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 Herpetologist to ensure the animal is handled appropriately until the lizard(s) can be assessed and treated.
- Lizards assessed by the Project Lead Herpetologist or vet 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.
- The reasons behind the injury or mortality will be assessed by the Project Herpetologist who may adapt management measures where possible to reduce further injury or mortality.
- The Project Herpetologist will notify the DOC Operations Manager for Mafaahui[4] within 48 hours after an injured or dead lizard found.
- 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 72 hours, frozen if longer than 72 hours to deliver.

10.2 'At Risk' or 'Threatened' species discovery

As outlined above, this LMP focusses solely on the management of Canterbury grass skink. All personnel working on site are responsible for alerting the Site Manager and the Project Herpetologist following the discovery of any other 'At-Risk' or 'Threatened' native **lizard species**on the same working day as the discovery.

The discovery of 'At-Risk' or 'Threatened' lizards not otherwise identified in this plan will be notified to the DOC Operations Manager for Mahaanui[4] immediately for advice. All site works associated with lizard salvage will stop and the lizard will be held temporarily in a suitable container (see Section 5.1 for details on suitable holding conditions) until advice on release has been provided by the local DOC office.

The Construction Site Manager must determine a course of action that is based on the advice of the Project Herpetologist. The course of action must consider the outcomes of consultation with DOC, and be submitted for certification to DOC.

[4] Department Of Conservation Christchurch Office – Level 3, Grand Central, 161 Cashel Street, Christchurch 8011. Phone: 0800 275 362, Email: christchurch@doc.govt.nz

10.3 Incident management and reporting

Where lizard habitat is removed without adhering to the protocols outlined in this LMP, the following actions will be undertaken under direction of the Project Herpetologist:

- The area affected is to be quantified and described through a field investigation. The habitat description shall include an assessment of the suitability of the habitat for lizards and likely species present.
- A report will be prepared outlining:
  - A description of the incident and reasons for the incident occurring.
  - An assessment of whether remedying, minimisation, offsetting or compensation is required through a standard ecological impact framework, such as the EIANZ guidelines (Roper-Lindsay *et al.*, 2018).
  - Remediation, minimisation, offset or compensation actions to be detailed in the report. Offset and compensation actions shall be informed by a suitably transparent and robust method such as Biodiversity Offset and Accounting Model (Maseyk et al., 2016) or Biodiversity Compensation Model (Baber et al., 2021).
  - Photographs of the affected habitat/area subject to clearance.
  - Recommendations to prevent incidents occurring in the future.
- Incident report to be delivered to DOC within 30 days of the incident.

11 Lizard Management Plan review

This LMP will be reviewed on or before the 10-year anniversary of the Approval date. The objective of the review is to re-assess habitat conditions and characteristics, and to update the LMP to reflect current species knowledge and current best practice lizard management and mitigation techniques. Follow review, the LMP will be submitted to DOC for certification.

12 Applicability

This report has been prepared for the exclusive use of our clients Aurecon NZ Ltd and New Zealand Transport Agency Waka Kotahi (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.

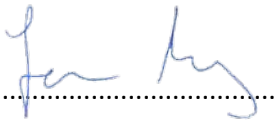
We understand and agree that NZ Transport Agency Waka Kotahi may submit this report as part of an application under the Fast-Track Approvals Act 2024 and the appointed panel will use this report for the purpose of assessing that application.

We understand and agree that this report will be used by DOC in undertaking their regulatory functions in connection with the Project.

This report has been prepared in accordance with the Tonkin & Taylor Ltd (T+T) sub consultancy agreement to "Belfast to Pegasus Motorway & Woodend Bypass pre-implementation & MSQA Professional services contract number 11320", dated 20 May 2025.

Tonkin & Taylor Ltd
Environmental and Engineering Consultants

Report prepared by:



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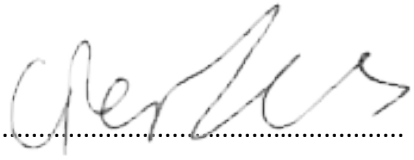
Jamie MacKay
Senior Terrestrial Ecologist

Authorised for Tonkin & Taylor Ltd by:



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Chris Perks
Project Director

Technical Review by Dr Liz Curry - Technical Director – Terrestrial Ecology

SHMO
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Appendix A Figures

- **Figure 1. Lizard habitat and skink detections across the Project site (Sheets 1-9).**

Overview

LEGEND

- Existing Designation
- Proposed alterations to the Designation
- Package 1: Ouside scope of Wildlife Approval - addressed within WAA 119946-FAU

Pegasus Interchange

Gladstone Road to SH1

Woodend Beach Road to Gladstone Road

Quarry Lakes to Woodend Beach Road

Cam River / Ruataniwha to Williams Street

Lineside Road to south of Cam River / Ruataniwha

Sheet 9
Sheet 8
Sheet 7
Sheet 6
Sheet 5
Sheet 4
Sheet 3
Sheet 2

A3 SCALE 1:20,000

0 210 420 630 840 1,050 Meters

LOCATION PLAN

Rangiora

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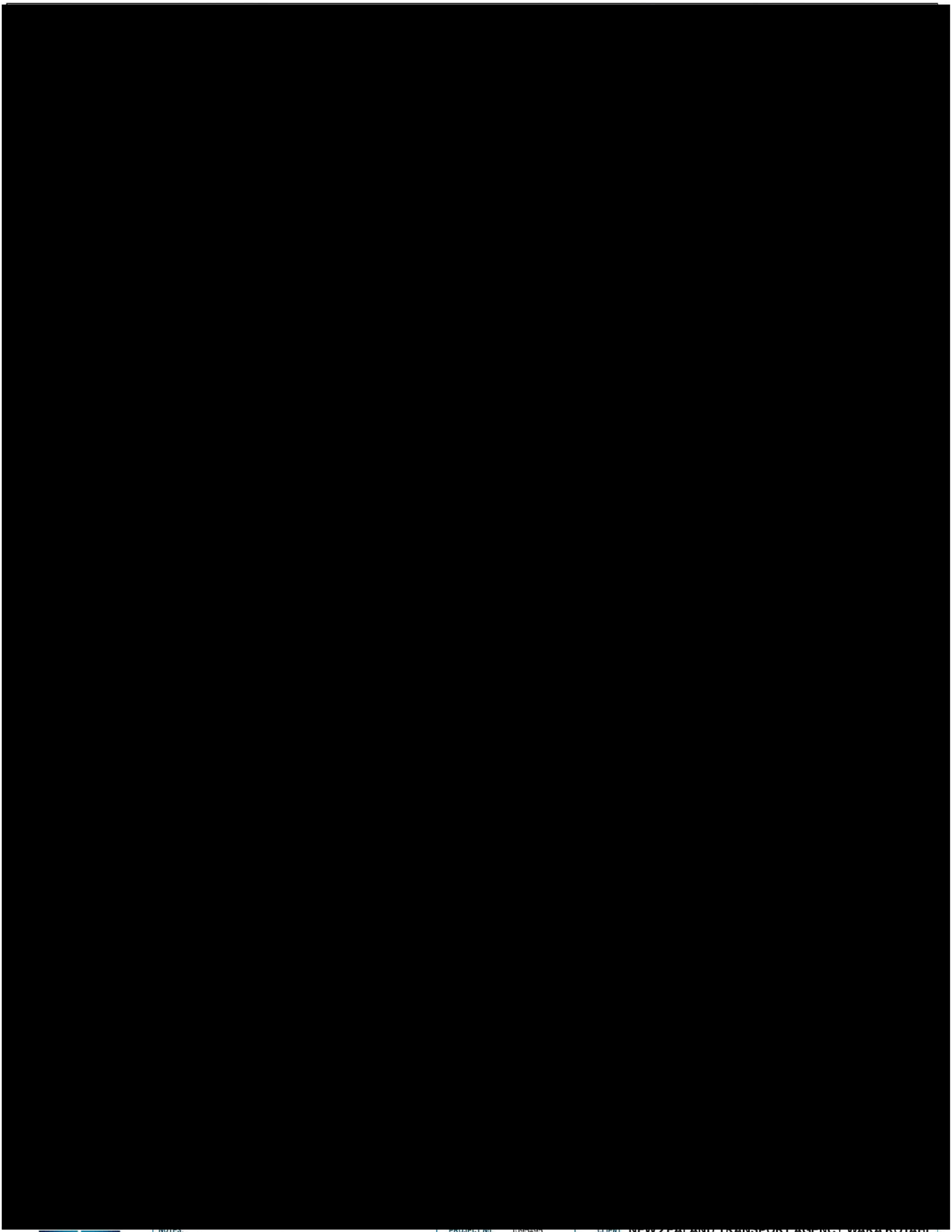
NOTES:
Basemap LINZ NZ Roads - Addressing: . NZ Navigation Map: Eagle Technology, LINZ, StatsNZ, NIWA, Natural Earth, © OpenStreetMap contributors.. NZ Imagery: Eagle Technology, Land Information New Zealand, GEBCO, Community maps contributors

REV	DESCRIPTION	GIS	CHK	DATE
3	Third version	ANDO	CHSA	SEPT.25

APPROVED 17/6/26 DATE

PROJECT No.	1095495		
DESIGNED	ANDO	SEPT.25	
DRAWN	ANDO	SEPT.25	
CHECKED	CHSA	SEPT.25	

CLIENT NEW ZEALAND TRANSPORT AGENCY WAKA KOTAHI
PROJECT B2P WOODEND BYPASS
TITLE PACKAGE 2: LIZARD VALUES WITHIN SCOPE OF WILDLIFE APPROVAL
SCALE (A3) 1:20,000 FIG No. SHEET 1 REV 3



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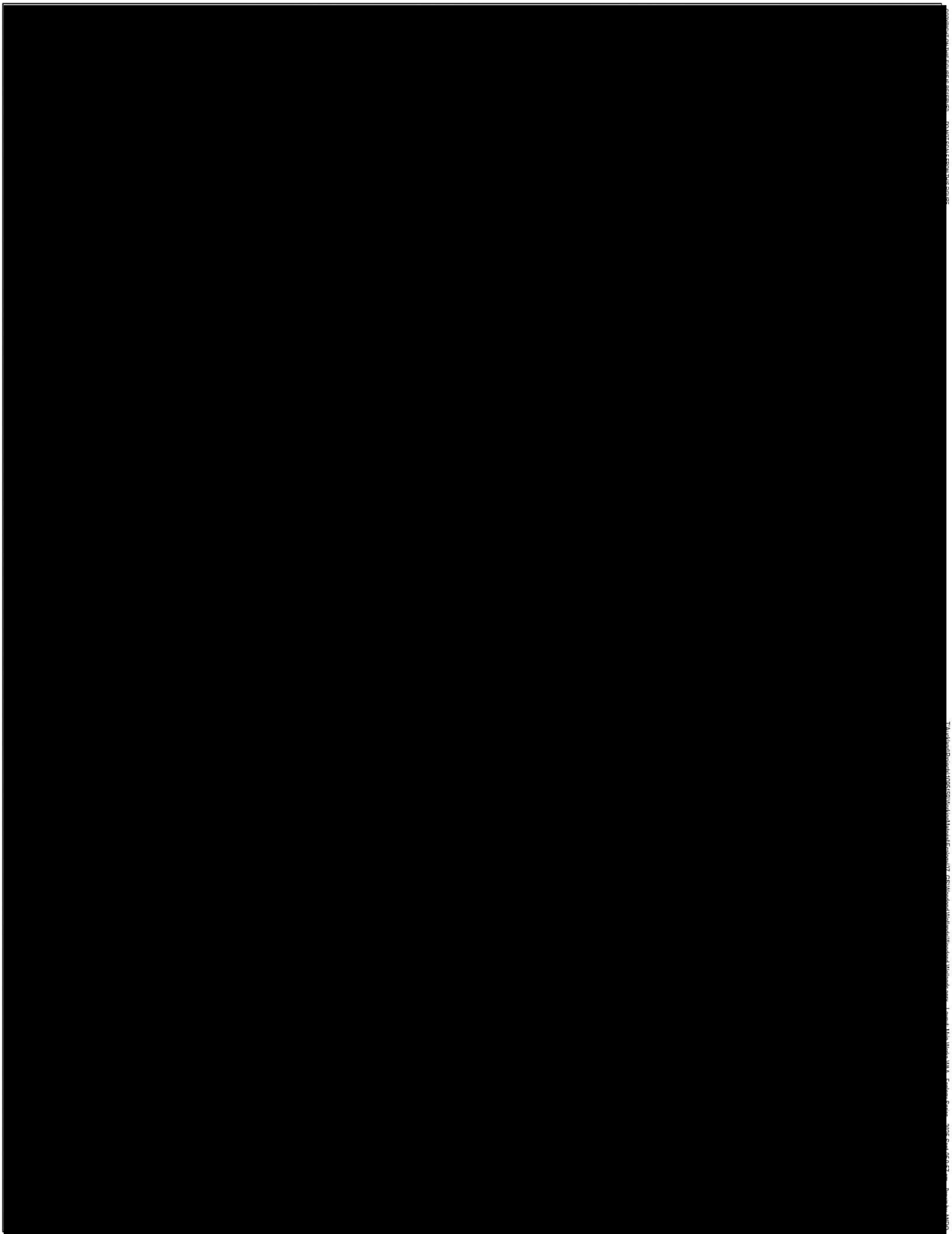
APPROVED 17/6/26 DATE

CLIENT NEW ZEALAND TRANSPORT AGENCY WAKA KOTAHI

PROJECT **B2P WOODEND BYPASS**

TITLE PACKAGE 2: LIZARD VALUES WITHIN SCOPE OF WILDLIFE APPROVAL

SCALE (A3) 1:2,000 FIG No. SHEET 2 REV 3



Basemap: LINZ NZ Roads - Addressing; - NZ Navigation Map: Eagle Technology, LINZ, StatsNZ, NIWA, Natural Earth, © OpenStreetMap contributors.. NZ Imagery: Eagle Technology, Land Information New Zealand, GEBCO, Community maps contributors

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3	Third version	ANDO	CHSA	SEPT.25

APPROVED 17/6/26 DATE

DESIGNED	ANDO	SEPT.25
DRAWN	ANDO	SEPT.25
CHECKED	CHSA	SEPT.25

PROJECT **B2P WOODEND BYPASS**

TITLE PACKAGE 2: LIZARD VALUES WITHIN SCOPE OF WILDLIFE APPROVAL

SCALE (A3) 1:4,000 FIG No. SHEET 3 REV 3

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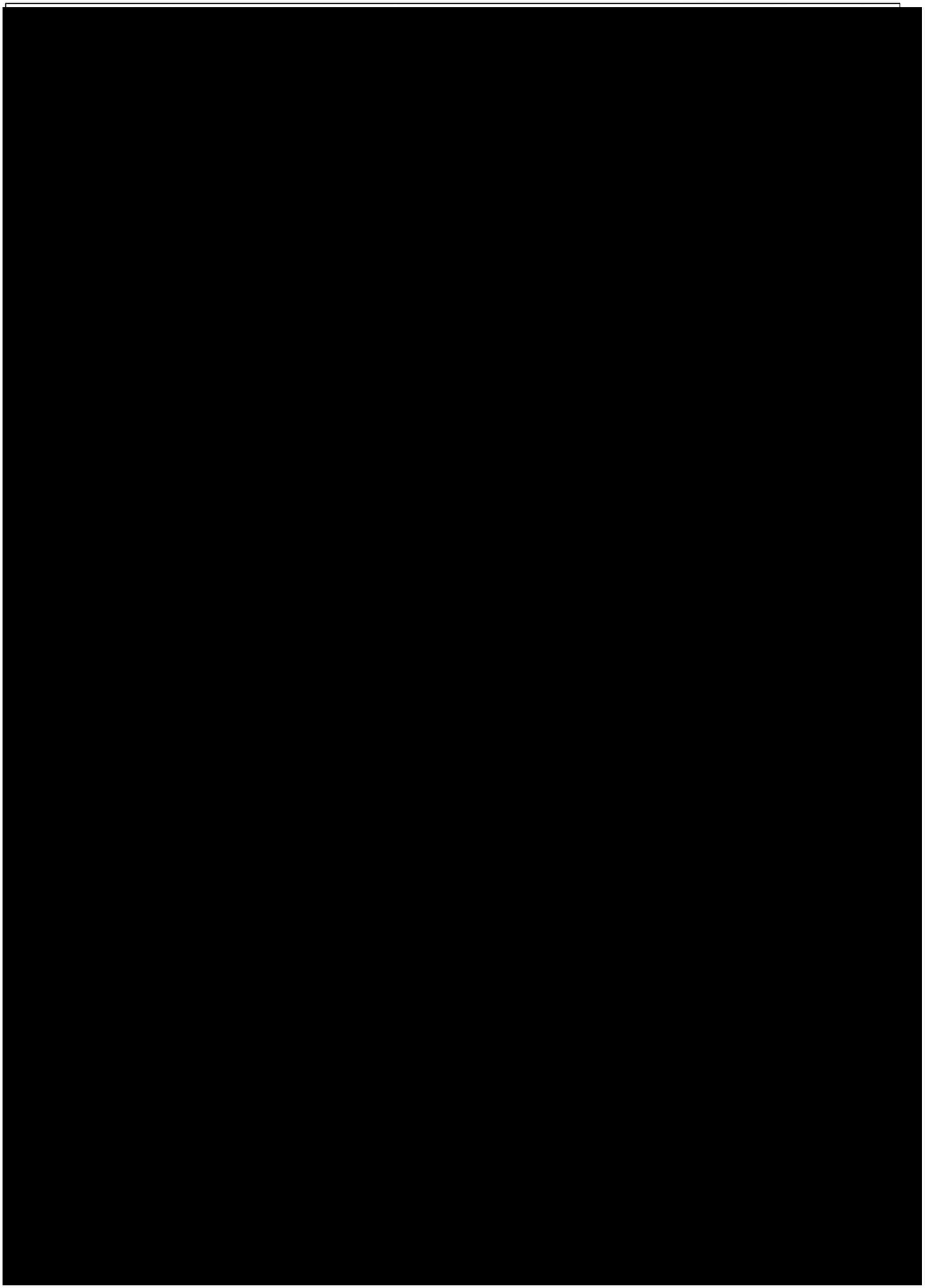

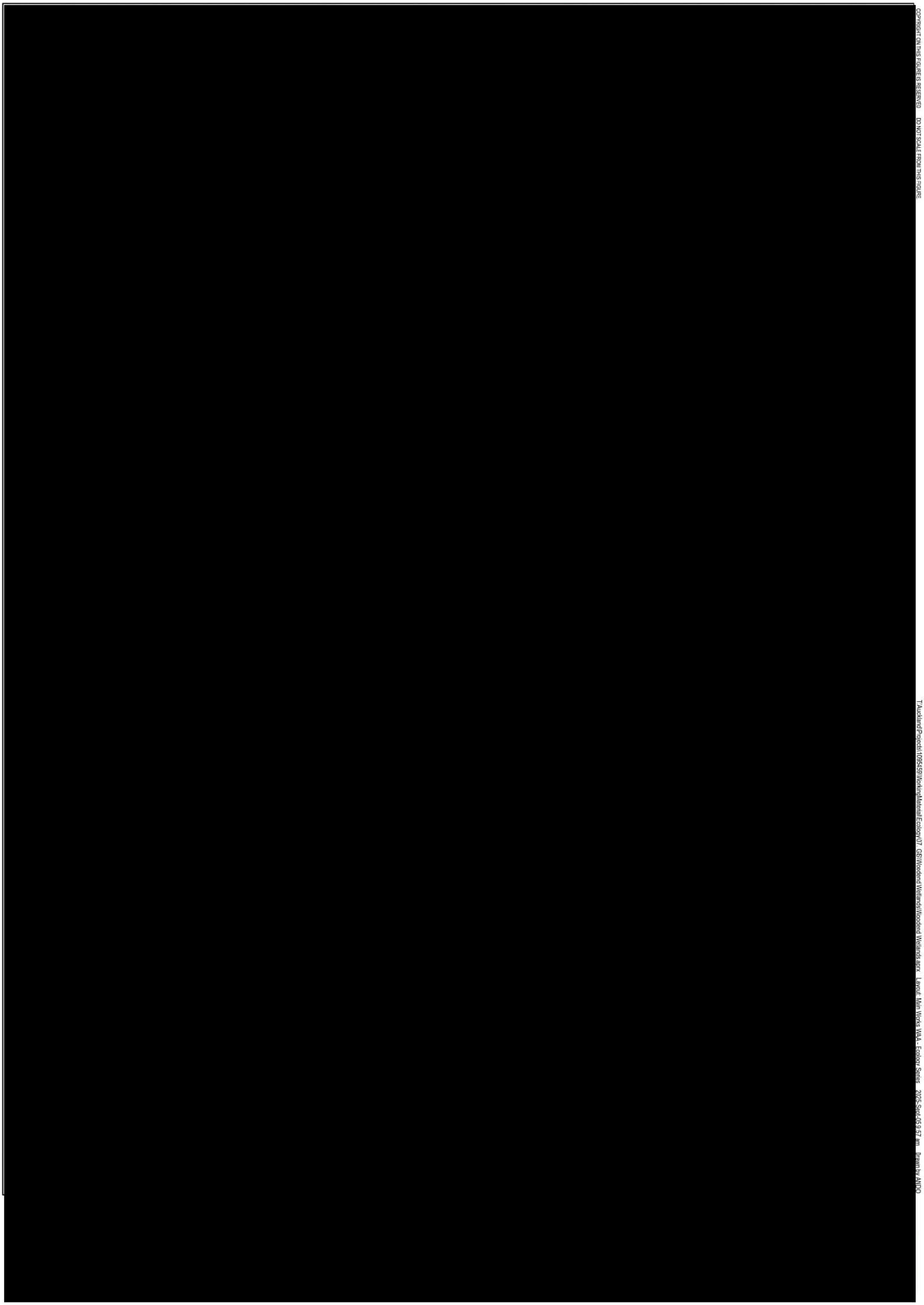

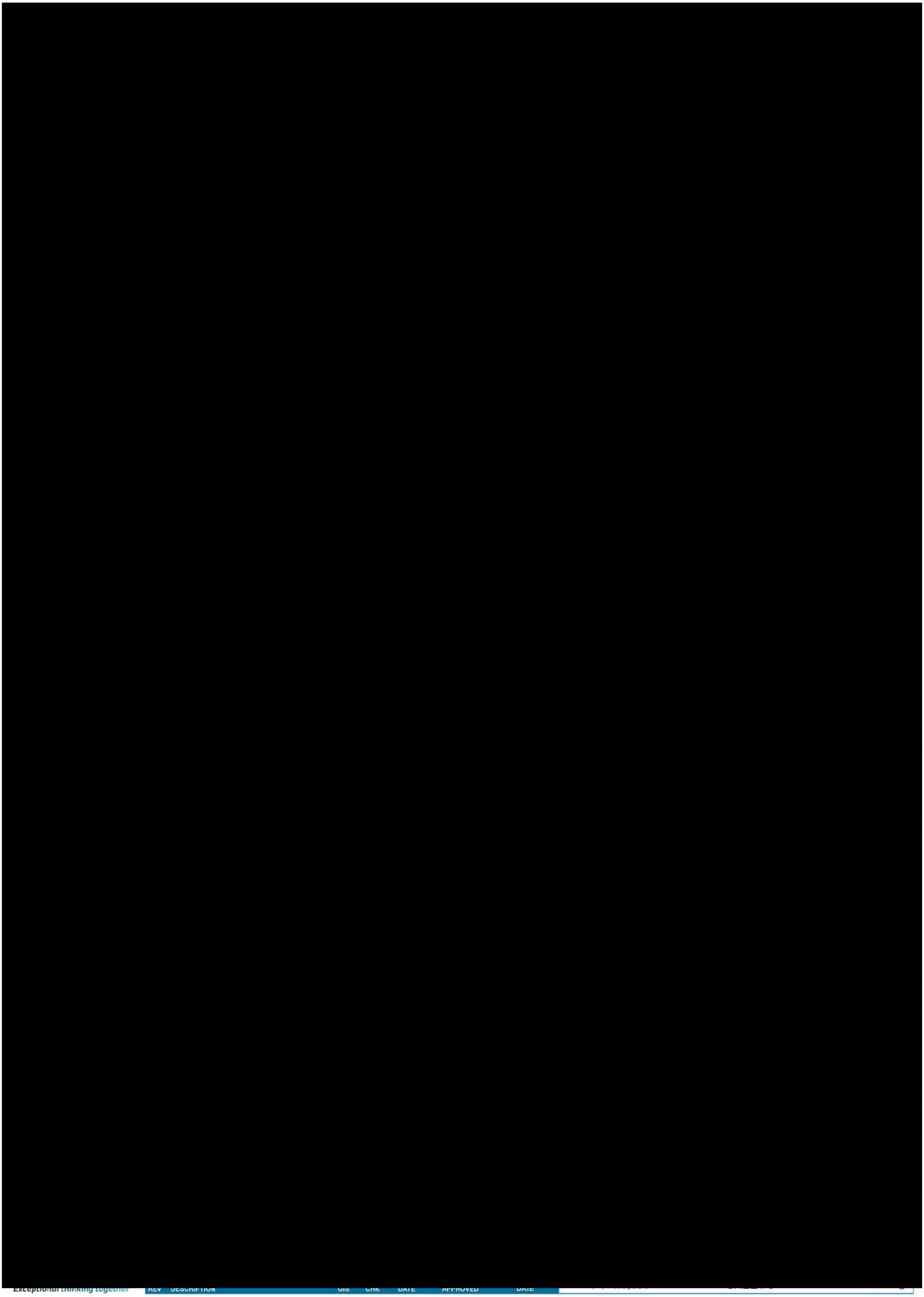

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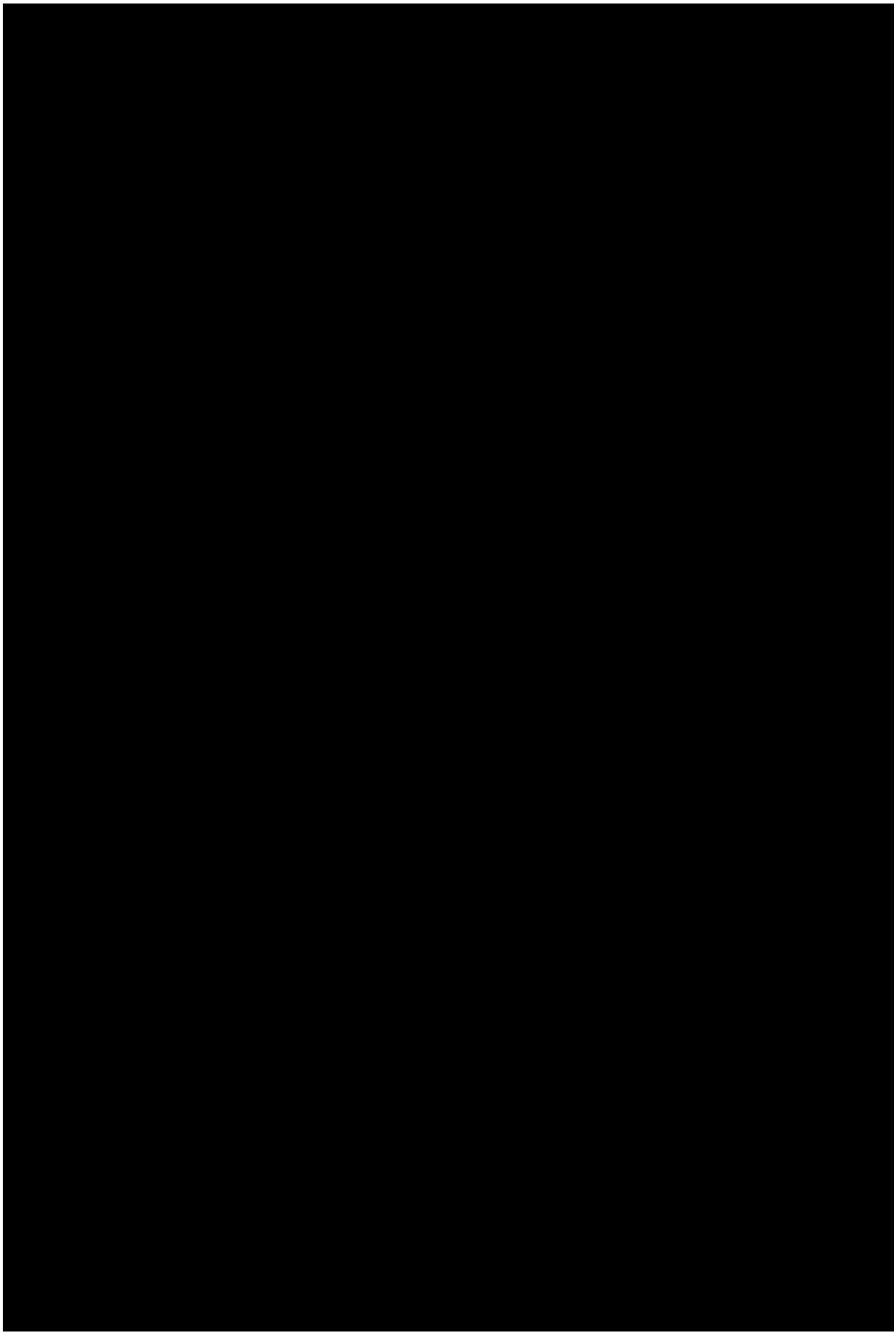
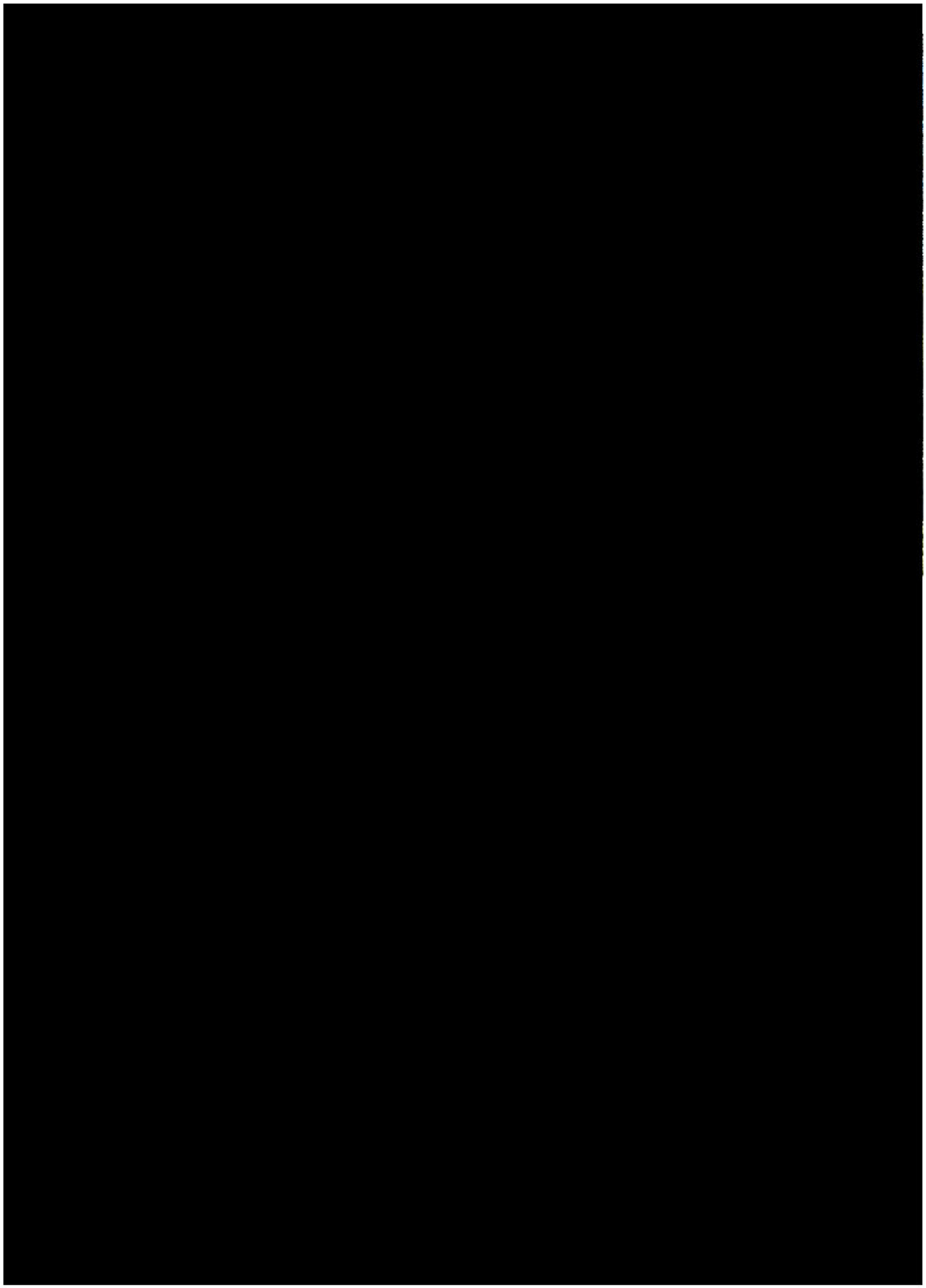
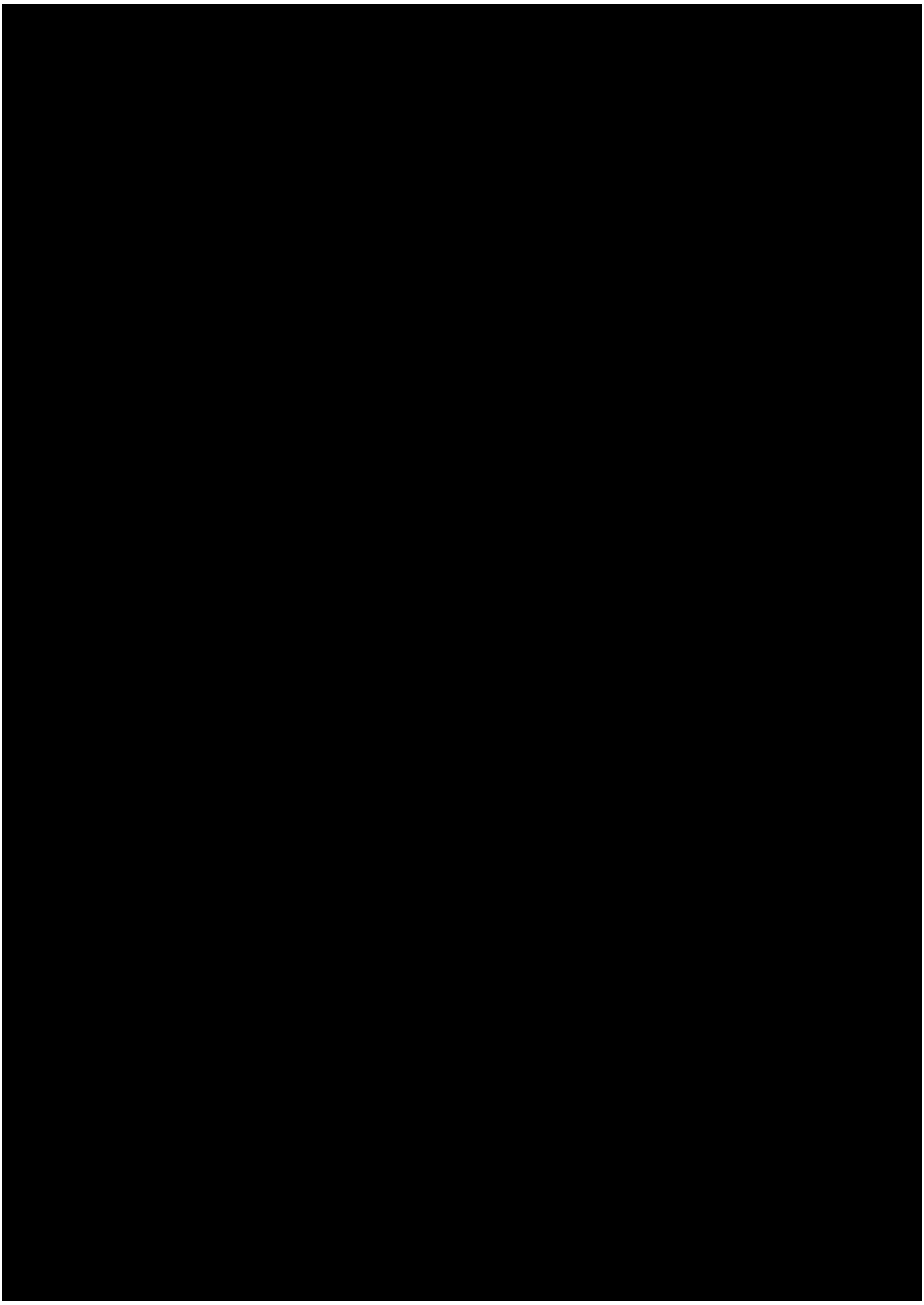
Appendix B Principles of lizard management

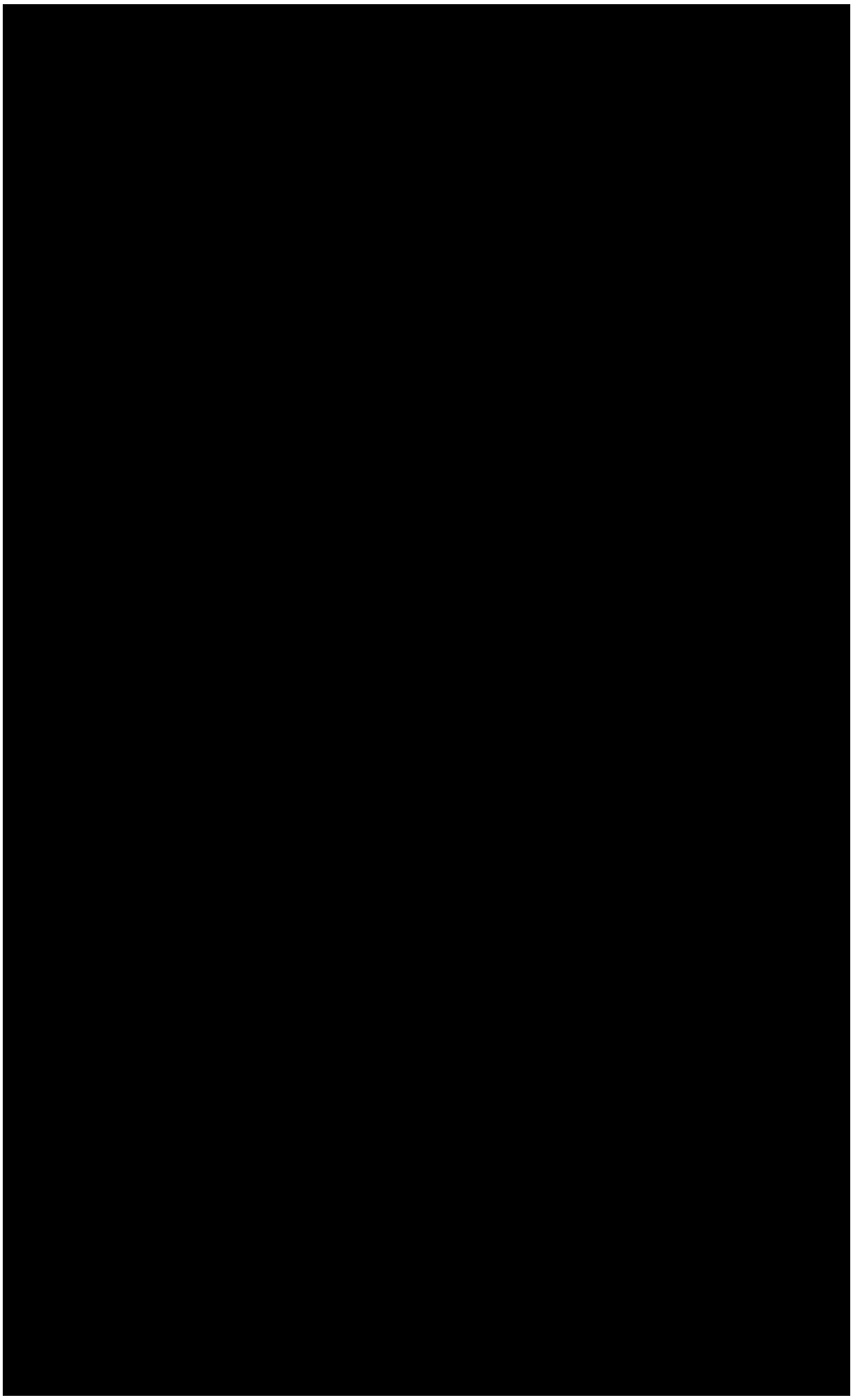
Appendix B Table 1: Nine principles of lizard management (DOC Lizard Technical Advisory Group, 2019) and how each principle is addressed by this LMP

Nine Principles of Lizard Management (Department of Conservation Lizard Technical Advisory Group, 2019)	How/where each principle is addressed in this LMP [*example text*]
1. Lizard species' values and site significance must be assessed at both the impact (development) and receiving sites.	• Lizard surveys were undertaken across the Project Site. Surveys comprised manual searches, tracking tunnels, funnel traps, and artificial cover objects. • Lizard habitat assessments were undertaken at both the impact and relocation sites. • Canterbury grass skink have been detected at both the impact site and proposed lizard relocation sites. • Refer to Section 3 and EcIA Volume 3I (T+T, 2025a) for a description of values and site significance. • Refer to Section 6 for description of proposed lizard relocation sites.
2. Actual and potential development-related effects and their significance must be assessed.	• Actual and potential effects of the project on lizards are described in Section 3.3 and in EcIA Volume 3I (T+T, 2025a).
3. Alternatives to moving lizards must be considered.	• Lizard habitat clearance minimised through the detailed design process. Completely avoiding lizard habitat was not possible due to other constraints associated with the road alignment. All alternatives for moving lizards were considered. • Refer to EcIA Volume 3I (T+T, 2025) for a description of the effects management process.
4. Threatened lizard species require more careful consideration than less-threatened species.	• No nationally or regionally Threatened species were identified during desktop and field assessments.
5. Lizard salvage, transfer and release must use the best available methodology.	• The proposed method is consistent with the best available methodologies (DOC, 2012).
6. Receiving sites and their carrying capacities must be suitable in the long term.	• Pest animal management for 5 years has been proposed at the relocation sites to increase the carrying capacity for native lizards. See Section 6, 7 and Appendix E.
7. Monitoring is required to evaluate the salvage operation.	• Post-relocation lizard monitoring is proposed as outlined in Section 7.
8. Reporting is required to communicate outcomes of salvage operations and facilitate process improvements.	• Reporting will be undertaken as outlined in Section 8.
9. Contingency actions are required when lizard salvage and transfer activities fail.	• Contingency actions will be undertaken as outlined in Sections 9 and 10 (Adaptive management measures and incident management and reporting).









Appendix D Habitat Enhancement Plan

D1 Introduction

D1.1 Purpose and scope

This Habitat Enhancement Plan (HEP) has been prepared to detail habitat restoration measures proposed for the Barkers Road relocation site receiving Canterbury grass skinks lizards salvaged from construction works area (Figure Appendix D.1). Restoration measures are being undertaken to improve the quality and carrying capacity of lizard habitat at the relocation sites, and will be implemented in such a way as to avoid or minimise the risk of injuring or disturbing resident lizards. This HEP addresses the following conditions:

- Measures for creation and enhancement of lizard habitat (condition WA.2 v.1).
- Measures to avoid and minimise disturbance to resident lizards within the release areas (condition WA.2 v.2).

Figure Appendix D.1: Barkers Road lizard relocation site where habitat enhancement will occur and contingency release site (indicative area).

D1.2 Associated documents

This HEP should be read in conjunction with the relevant documents listed below:

- State Highway 1 North Canterbury—Woodend Bypass Project (Belfast to Pegasus) - Substantive Application - Ecological Impact Assessment (EcIA) (T+T, 2025).
- State Highway 1 North Canterbury – Woodend Bypass Project (Belfast to Pegasus) – Lizard Management Plan (Main Works LMP) (T+T, 2026a).
  - Appendix D1: Pest Mammal Management Plan (PMMP) (T+T, 2026b).
  - Appendix D2: **[THIS HEP]**.
- Lizard Management Plan for Belfast to Pegasus (Woodend Bypass) Road of National Significance - Early Works (Wildland Consultants, 2025). LMP for Wildlife Act Authority 119946-FAU.
- State Highway 1 North Canterbury – Woodend Bypass Project (Belfast to Pegasus) – Construction Environmental Management Plan (EMP) (T+T, 2026c).
- Package 1 Wildlife Act Authority [119946-FAU].
- Package 2 Wildlife Approval (WAC) [TBC].
- Resource Consent [TBC].

D1.3 Responsibilities

Key responsibilities and competencies of relevance for the delivery of, and compliance with, this HEP are detailed in Appendix D Table 1.

Appendix D Table 1: Roles and responsibilities for the implementation of this HEP

Organisation (Role)	Contact	Responsibilities and competencies
NZTA (Project Owner)	XXX	• Reading the HEP and understanding the implications for the wider project. This includes overseeing the implementation of the HEP at a high level. • NZTA are required under the Wildlife Approval [TBC] and the LMP to implement this HEP. • Reading and understand this HEP. • Engaging Project Manager, Project Herpetologist, and Restoration Contractor.
NZTA or Main Contractor (Project Manager)	XXX	• Co-ordinates communication between the Project Owner, the Restoration Contractor, and Project Herpetologist. • Briefing new personnel about responsibilities under this HEP.
XXX (Main Contractor/Construction Site Manager)	XXX	• Delivery of and compliance with the LMP, PMMP and HEP. • Implementation of the LMP, PMMP and HEP including the following: – Reading and understanding the LMP, PMMP and HEP. – Facilitating a project start-up meeting with the Project Ecologist(s) before construction commences.

Organisation (Role)	Contact	Responsibilities and competencies
		– Contacting the Project Herpetologist a minimum of one month before any potential lizard habitat areas are scheduled for clearance. – Maintaining clear lines of communication with the Project Herpetologist regarding changes to the works schedule. • Briefing new personnel about the contractor's responsibilities under the LMP, PMMP and HEP.
XXX (Project Herpetologist)	XXX	The Project Herpetologist is a lead ecologist named on the Project's WAC. They are to be engaged by the Project Owner to provide technical advice to the Restoration Contractor and to assist the Project Manager with compliance with this HEP. The Project Herpetologist will: • Provide technical support to Project Owner and the Restoration Contractor to implement this HEP. • Have suitable experience in lizard habitat restoration. • The Project Herpetologist will be approved by DOC and named on the WAC.
XXX (Project Ecologist(s))	XXX	Project Ecologists includes the Project Herpetologist and all ecologists working under the supervision of the Project Herpetologist to support compliance with this HEP.
XXX (Restoration Contractor(s))	XXX	• Delivery of, and compliance with, this HEP. • Reading and understanding this HEP. • Communicating with Project Manager and the Project Herpetologist. • Responsible for planting works (Section D4), maintenance and pest control (Section D5), and monitoring (Section D6). • Communicating with the Project Herpetologist and Project Manager if any changes are required through the adaptive management process. • This role may be undertaken by one or more contractors at the discretion of the Project Owner.
XXX (Pest Control Contractor(s))	XXX	• May be one or more contractors at the discretion of the Project Owner. • Reading and understanding the responsibilities detailed in the PMMP. • Communicating with the Project Owner, the Project Herpetologist, and the Restoration Contractor. • Communicating with the Project Herpetologist and Project Owner if any additional pest animal control for plant maintenance is required, as agreed on by the Restoration Contractor. • Briefing new personnel about responsibilities under the HEP. • Must hold appropriate certifications and competencies for the pest control tools being used.

D1.4 Programme

Habitat restoration activities will be undertaken following the programme timeline detailed in Appendix D Table 2. The timeline outlines a phased approach to site enhancement for lizard salvage and relocation. A pre-start meeting will be held before site preparation works commence to allow the Project Herpetologist to discuss works with the Restoration Contractor, particularly in regard to measures to be undertaken to avoid or minimise impacts on resident native lizards.

- At least three months prior to relocation, initial pest plant survey and control will occur, followed by enhancement planting (May – September), construction of rock and wood piles, and commencement of pest mammal control at least three months before release.
- Year one includes ongoing pest plant and pest mammal control where required, with replacement planting and habitat unit maintenance where needed, and ongoing monitoring of pest plants and enhancement planting survival.
- From years two to five, all year one activities will continue at a reduced frequency.

The five-year maintenance and monitoring period will continue for five years from the date that the final lizard is relocated.

Appendix D Table 2: Five-year habitat restoration programme for the lizard relocation site

Timeline	Site preparation	Enhancement planting	Pest plant control	Additional habitat units	Pest animal control
Prior to lizard salvage and release	• Spot treatment of rank grass control preparation for planting. • Establish biodegradable wool weed mat for rock and wood piles.	• Undertake enhancement planting between April – October. • Two to three monitoring visits between October to April. • Infill planting from April to October where necessary.	• Initial pest plant assessment by a suitably qualified contractor. • Pest plant control will be implemented a minimum of one month before any planting. • Ideally initial pest plant control to occur over growing season (Oct-April) but can be undertaken during winter months at discretion of Restoration Contractor.	• Construct rock and wood piles atop biodegradable wool weed mat.	• Begin pest animal control, as per the PMMP. • Undertake pūkeko and/or rabbit control if damage to planting noticed and Restoration Contractor considered this is necessary.
Year one		• Three monitoring visits in October, January and March. • Infill planting April to October where necessary.	• Pest plant monitoring during enhancement planting monitoring. • Releasing and pest plant control as required October – April.	• Control plant growth within wood and rock piles during seasonal pest plant control. • Maintain habitat units if necessary.	• Undertake pest mammal control, as per the PMMP. • Undertake pūkeko and/or rabbit control if damage to planting noticed and Restoration Contractor considered this is necessary.
Years two – five (from time of final lizard release)		• One monitoring visit in March to identify infill planting requirements where necessary. • Infill planting April to October where necessary.	• Pest plant monitoring during enhancement planting monitoring. • Releasing and pest plant control as required October – April.	• Control plant growth within wood and rock piles during seasonal pest plant control. • Maintain habitat units if necessary.	• Undertake pest mammal control, as per the PMMP. • Undertake pūkeko and/or rabbit control if damage to planting noticed and Restoration Contractor considered this is necessary.

Note: The specific timings of the restoration activities will be determined by the Restoration Contractor and Project Herpetologist.

D2 Site preparation

Prior to lizard salvaging, preparation works will be required at lizard relocation site to ensure the habitat is suitable for native lizards. The Project Herpetologist will direct and supervise the Restoration Contractor to undertake the site preparation works, with the objective of creating a suitable habitat mosaic for Canterbury grass skink within the wider rank grass habitat matrix. This will comprise the placement of refugia log and rock piles interspersed with "islands" of native planting. Site preparation tasks will include:

- Placement of biodegradable wool weed mats laid down to suppress grass growth in areas designated for refugia wood piles and rock piles (see Section 3). This will prevent shading and overgrowth from the exotic grasses of the refugia microhabitat features.
- Control of woody pest plant species throughout the release site and spot treatment of rank grass in areas where enhancement planting is to be undertaken (see Section 4). Rank grass will be cleared when lizards are most active (i.e. October – April, warm and dry weather) and will utilise hand weeding methods where possible to ensure conditions are favourable for natural lizard dispersal from impacted areas. Weed eaters and spot spraying methods will only be utilised where necessary.
- Pest plants may potentially provide bird breeding habitat during peak bird breeding season (August - March). Most indigenous birds are protected under the Wildlife Act 1953 and vegetation clearance will be managed to either avoid or minimise direct effects to birds during peak bird breeding season. Refer to the project Avifauna Management Plan (forming part of the Construction Environmental Management Plan (T+T, 2026c)) for details of how to minimise direct effects on birds if clearance must be undertaken during peak breading season.
- Where fencing doesn't already exist, a stock proof fence will be installed around any remediation plantings to exclude any current or future stock access. A gap of at least 1 m will be left between the plantings and the fence to prevent browsing by stock, or an electric wire installed to prevent animal browsing of the plantings. The fence shall be inspected annually and repaired or replaced as required. To maintain the outcomes of the enhancement measures any planting areas will remain fenced off from stock (and maintained) with a 1 m buffer.

D3 Additional habitat units

To increase suitable lizard habitat, provide additional shelter and protection from predators, habitat enhancement will be undertaken through the placement of log and rock piles (300 features; 50/ha). The placement of rock and wood piles will be supervised by the Project Herpetologist to ensure they are placed correctly and ensure that disturbance to the site is minimised. Piles will be placed in general accordance with the following methodologies and will be undertaken where practicable:

Wood piles

- Wood piles will be installed during vegetation clearance as and when suitable logs become available.
- A minimum of 12 m / ha of manageable portions of site-won logs will be deployed into landscape planting areas on weed matting. The specific number of wood piles will be determined by the Project Herpetologist, but 300 features (rock piles and log piles) will be added to the lizard relocation site in total.
- Woody material will be placed in piles spaced at least 10 m apart from one another and in locations where it is unable to be dislodged into streams.
- Logs shall be of suitable species that do not pose biosecurity risks.

- Log piles are to be constructed of small/medium logs of varying diameters (i.e. ~0.1 – 0.5 m) and cut into ~0.5 – 1.5 m lengths.
- Piles are to be short (i.e. <0.5 m high) and sprawling to provide a mix of sun-exposed basking areas and shaded microhabitats.

Rock piles

- Rock piles will be installed at least three months prior to lizard salvage commencing.
- Rock piles will be deployed into dry landscape planting areas on weed matting spaced at least 10 m apart. T The specific number of wood piles will be determined by the Project Herpetologist, but 300 features (rock piles and log piles) will be added to the lizard relocation site in total.
- Local washed rock material (i.e. greywacke or river rocks) from the Canterbury region will be utilised to construct rock piles where practicable, with imported rocks used only where required.
- Rock piles will be constructed of small/medium rocks of varying diameters (i.e. ~0.02 – 0.50 m) to ensure cavities are of a suitable size for Canterbury grass skink (Herbert et al., 2023).
- Piles are to be short (i.e. <1.0 m high) and sprawling to provide a mix of sun-exposed basking areas and shaded microhabitats (e.g. Figure Appendix D.2).

Figure Appendix D.2: By way of example, this shows a rock pile providing Canterbury grass skink habitat at the Early Works lizard release site at Kaiapoi Lakes Reserve (25 April 2026).

D4 Enhancement planting

D4.1 Overview

The enhancement planting described below aims to provide protective benefits for lizards at the relocation sites. The proposed enhancement measures are in general accordance with DOC's guidance for developers, consenting authorities, and ecologists/herpetologists (Department of Conservation Lizard Technical Advisory Group, 2023). More specifically, measures provide:

- Food: Provides a variety of small insects as well as native plants that produce berries and/or nectar.
- Shelter: Ensure protection from the elements and safe overwintering sites, such as logs, rock piles, or dense vegetation.
- Basking areas: Lizards are cold-blooded and require sunny basking areas to warm themselves.
- Protection from predators: Native lizard populations are vulnerable to predation by introduced mammals and some bird species. Rock piles, woody debris, and thick vegetation (including grasses, vines, and shrubs) offer effective cover.

Planting will be undertaken at the relocation sites by the Restoration Contractor in accordance with the design specifications detailed in Figure Appendix D.3 landscape planting drawing (UD-DRG-0251). Planting will be undertaken in general accordance with Appendix D Table 3 which specifies the spacing, density, and counts for each lizard-friendly species to be planted at the relocation sites. Minor variations to this specification may be made at the discretion of the Project Herpetologist and/or Restoration Contractor.

Planting will be undertaken between May and October, when soil moisture is sufficient and must be implemented prior to salvage, to minimise disturbance to the released lizards.

Subsequent sections provide detail as to how planting is to be undertaken.

Figure Appendix D.3: Landscape planting plan.

Appendix D Table 3: Enrichment planting palette with indicative counts and planting distribution attributes for Barker's Road Relocations Sites A and B

Species	Common name	Centres (m)	Density (m^2)	Area A		Area B	
				Count	Total	Count	Total
High cover planting mix							
Poa cita	Pātītī | Silver tussock	0.5	2	2,338	3,546	672	1,019
Austroderia richardii	South Island toetoe	1	0.5	585		168	
Muehlenbeckia astonii	Pōhehue	1	0.5	292		84	
Cordyline australis	Ti kōuka | Cabbage tree	1	0.1	39		11	
Coprosma crassifolia	Mingimingi	1	0.5	292		84	
Moderate cover planting mix							
Ozothamnus leptophyllus	Tauhinu	1	0.75	585	2,242	168	644
Sophora prostrata	Prostrate kōwhai	1.5	0.5	195		56	
Coprosma propinqua var. propinqua	Mingimingi	1	0.75	292		84	
Pomaderris amoena	Tauhinu	1	1	390		112	
Carmichaelia australis	New Zealand broom	1.5	0.5	195		56	
Coprosma acerosa	Tātaraheke	1.5	0.5	195		56	
Teucrium parvifolium	Teucridium	1	1	390		112	
Low cover planting mix							
Festuca novae-zelandiae	Fescue tussock	1	0.1	97	251	28	74
Muehlenbeckia axillaris	Creeping pōhuehue	2	0.1	19		6	
Carex buchananii	Buchanan's sedge	1	0.1	19		6	
Melicytus alpinus	Porcupine shrub	1	0.1	97		28	
Cordyline australis	Ti kōuka | Cabbage tree	3	0.1	19		6	

D5 Enhancement planting implementation specifications

D5.1.1 Plant stock and schedule

A planting schedule that includes, at a minimum, taxa names, numbers, spacings, and locations, is to be prepared by the Project Herpetologist and confirmed by NZTA prior to the implementation of this HEP. The planting schedule is to be implemented in conjunction with this HEP.

Where practicable, species planted are to be eco-sourced from the Lower Plains Ecological District (ED), and preferably from a nearby source. Native plants grown from seeds collected within the region are likely adapted to the local climate and will generally do better. Depending on stock availability, some species changes may be required during planting. Any changes should be recorded to enable successful monitoring of the planting.

Optimal planting stock will be planted which has the following characteristics:

- Healthy, vigorous, and free from obvious signs of disease and pests.
- Of at least average size for the specified pot, planter bag size (i.e. PB).
- Well-developed root system with a high amount of new root growth.
- Not root bound.
- Well-branched and symmetrically shaped.

D5.1.2 Planting hygiene to minimise risk of myrtle rust

The Project will meet any obligations under the Biosecurity Act 1993 to prevent the spread of unwanted organisms. This includes the spread of plant pathogens and pest plant seeds.

To reduce the risk of spreading plant pathogens (e.g., myrtle rust) and pest plant seeds, the Project must ensure all boots and equipment used are clean and free of seeds or plant material. This applies when entering and leaving the site. Spraying boots and equipment with Sterigene is recommended to prevent the spread of any potential plant pathogens.

All plants will be sourced from nurseries holding a Plant Pass certification issued by NZ Plant Producers Inc[1]. Plant producers certified by Plant Pass have committed to identify, control, manage or avoid pest and biosecurity hazards in their nursery and production processes. This minimises the risk of spreading plant pathogens, pest plants, and pest mammals during restoration planting.

D5.1.3 Post-planting inspection

Records of how planting was undertaken are to be collected and measured against the specifications outlined in the above sections and Section D5.2. The Project Herpetologist will visit each planting site and compare the completed planting against these specifications and assess the health of plant stock used during the planting period. Where inconsistencies and/or issues are identified with the planting, the Project Herpetologist will contact the Restoration Contractor and Project Owner as required to determine what actions are required.

D5.1.4 Timeframe for enhancement planting implementation

A proposed timeframe for implementing the enhancement planting programme is provided in Appendix D Table 2.

[1] https://nzppi.co.nz/PLANT-PASS/29594/

D5.2 Planting methodology

The following planting methodologies will be followed:

- Plants will be laid out as per the spacing requirements provided in the plant schedule (Appendix D Table 3).
- The plant will be planted, along with a fertiliser tablet, in the ground by filling the space surrounding the root ball with soil and lightly press the soil to fill any voids which may otherwise become waterlogged. For maintenance and monitoring purposes each plant is to be marked with a bamboo stake.
- Except for the use of biodegradable wool weed mat beneath wood and rock piles, the use of weed mats, mulch, bark and woodchip 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.
- Enhancement plantings in rural settings are likely to be impacted by hares, rabbits and pūkeko. In the first instance biodegradable sleeves/shields should be placed around the stems of woody plants to aid in reducing any browser damage from pest species. The sleeves are to be used as recommended by the manufacturer and will be removed manually if they do not decompose over time to avoid collaring effects.
- If browsing damage is noted by the Restoration Contractor, the pest animal control measures outlined in Section D5.3.3 will be undertaken.

D5.3 Plant maintenance and pest plant control

Grasses and woody weeds can smother young native plants during their first season. To ensure that the established lizard habitat within the relocation sites remains in good condition, maintenance activities will be required on a regular basis (see Appendix D Table 2).

Planting maintenance and monitoring will be implemented by the Restoration Contractor for five years after planting is undertaken. Planting will be followed by monitoring visits every two months from October – April to ensure the uptake and survival of plantings and to determine what maintenance is required. The following sections detail maintenance methods and key target species.

D5.3.1 Infill planting

- If plant loss exceeds 10%, infill planting will occur over May – September using species from the Appendix D Table 3 planting palette, as directed by the Restoration Contractor.
- During monitoring visits, the Restoration Contractor will note any evidence of pest mammal browsing and will advise the Project Manager and Project Herpetologist as to whether pūkeko and/or rabbit/hare control is recommended (see Section D5.3.3).

D5.3.2 Pest plants

- Pest plant monitoring will be undertaken in conjunction with enhancement planting monitoring.
- Pest plant control in enhancement planting areas and within/around the rock and wood piles will be undertaken in warm, dry weather between October – April. Where possible, hand weeding methods will be used to ensure natural lizard dispersal from control areas. Weed eaters and herbicides will only be used where necessary to avoid potential adverse effects on lizards and other native fauna. If lizard and translocation activities occur over multiple

seasons, pest plant maintenance activities will be undertaken outside of the lizard salvage period (October to August) to minimise any adverse impacts on recently translocated lizards.

- 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.
- Rank grass non-weedy grass matrix habitat species (e.g. cocksfoot (*Dactylis glomerata*), browntop (*Agrostis capillaris*), tall fescue (*Festuca arundinacea*)) found between planting areas will be left untouched.
- Key pest plant species likely to be present within the relocations site enhancement areas are detailed in Appendix D Table 4, including brief descriptions and possible control methods (as per Weedbusters (n.d.)).

Appendix D Table 4: Pest plant species confirmed or potentially present within the release site and recommended control methods

Pest plant	Description	Control methods[1]
Blackberry (*Rubus fruticosus*)	Woody, thorny scrambling shrub; forms dense, tangled thickets.	Preferred • Cut stump and treat for large canes. • Hand pulling of small seedlings (careful of regrowth). If necessary • Foliar spray on active growth.
Broom (*Cytisus scoparius*)	Woody shrub up to 2 m; bright yellow flowers; forms dense thickets.	Preferred • Hand pulling for small seedlings. • Cut stump and treat larger stems. If necessary • Foliar spray for patches of young broom. • Basal treatment: spray herbicide mix around base.
English ivy (*Hedera helix*)	Evergreen climber with woody stems; smothers trees and ground.	Preferred • Hand pulling of small infestations and roots. If necessary • Hand Cut, release and foliar spray of lower leafy stems.
Gorse (*Ulex europaeus*)	Woody shrub up to 3 m tall; yellow flowers; dense spiny branches.	Preferred • Hand pulling for young plants. • Cut stump and treat: cut close to ground, apply herbicide gel immediately. If necessary • Basal treatment: apply herbicide mix to lower stems. • Foliar spray for seedlings or small plants.
Lupin (*Lupinus arboreus / polyphyllus*)	Perennial shrub or herb up to 1.5 m tall; colourful flower spikes.	Preferred • Hand pulling seedlings (ensure root removal). • Cut stump and treat larger plants. If necessary • Foliar spray with selective herbicide during active growth.

Pest plant	Description	Control methods[1]
Marram grass (*Ammophila arenaria*)	Perennial tussock-forming grass up to 1 m tall; invades and displaces natives.	Preferred • Hand pulling small patches (remove entire root system). If necessary • Foliar spray using glyphosate where safe.
Old man's beard (*Clematis vitalba*)	Woody perennial climber; up to 20 m long; smothers trees and shrubs.	Preferred • Hand pulling of juveniles. • Cut stump and treat stems close to ground, leave cut sections off the soil. If necessary • Hand cut, release and lower foliar spray for fine stems.
Pine (*Pinus* spp.)	Large evergreen conifer; forms wilding forests displacing natives.	Preferred • Drill and fill for mature trees. • Cut stump and treat for saplings. If necessary • Basal spray for smaller trees or multi-stemmed specimens.
Willow (*Salix* spp.)	Large woody tree; invades wetlands and river margins.	Preferred • Drill and fill: Drill around trunk and inject herbicide. • Cut stump and treat smaller plants. If necessary • Basal treatment on smaller stems.

Note 1: Control methods summarised from Weedbusters (n.d.) website.

D5.3.3 Pest animal control for plant maintenance

Pest animal control targeting potential browsing animal pest species will only be undertaken where evidence of significant browsing damage to enhancement planting is observed during seasonal monitoring (see Appendix D Table 3), and as advised by the Restoration Contractor. Key pest animal species include rabbits, hares, and pūkeko. Potential impacts of these species are detailed in Appendix D Table 5.

Appendix D Table 5: Potential browsing animal pest species and their impacts on planting establishment

Pest animal species	Impacts
Rabbits/hares	Rabbits, and to a lesser extent hares, can have adverse effects on vegetation through browsing and ringbarking of native shrub and tree seedlings, limiting revegetation (Norbury, 1996). Large pest populations can damage many hundreds of seedlings over a short time period (e.g. a few days).
Pūkeko	Pūkeko can cause significant damage to newly planted native seedlings by browsing and removal from the ground. Pūkeko have significant damage to tree planting programmes on Tiritiri Matangi and Mana Islands (Dey & Jamieson, 2013).

Rabbits and hares will be shot at night using best practice spotlighting methods and as recommended by the Pest Control Contractor (National Pest Control Agencies, 2015). The police will need to be notified prior to any night shooting, and local and national bylaws and legislation will

need to be followed. Higher-density pest animal populations may require multiple nights of control to achieve eradication.

In the first instance, pūkeko will be controlled through deterrence measures such as fencing, netting, and visual/auditory deterrents, as recommended by the Pest Control Contractor. Lethal methods will only be considered as a last resort. Shooting will only be carried out under an appropriate Fish & Game license during the duck shooting season.

D6 Monitoring

Monitoring of enhancement planting, pest plants, and animal browsing will be undertaken concurrently during October – April over a five-year period following the first lizard relocation in accordance with the Appendix D Table 2 programme. This will include:

- Monitoring of enhancement planting survival and assessment against the 90% survival target.
- Inventory of pest plant species present including the quantity, locations, and age/size of the plants.
- Observations of browsing damage to enhancement planting, including the proportion of plantings affected and the species affected.

D7 Adaptive management

An adaptive management approach, such as outlined in the EIANZ Guidelines (Roper-Lindsay et al., 2018) for Ecological Impact Assessments, will be adopted for habitat restoration management methodologies to respond to new knowledge and unexpected events. The adaptive management framework will address the uncertainty associated with the response of flora and fauna to management allowing flexibility in methods and approaches where needed to reach the best ecological outcomes.

NZTA will be contacted within a week of the completion of each monitoring round, and an adaptive management approach will be agreed upon by all parties to ensure effective habitat restoration is achieved, if either of the following occurs:

- The condition of the relocation site deteriorates, resulting in a reduction of suitable habitat availability.
- Browsing damage from pest animals to enhancement plantings remains high following the implementation of control measures.

The methods or approaches will be varied based on experience and research to restore habitat to a level which provide appropriate protection for native lizards. This may also include increasing the range of control targeted species should monitoring indicate that non-targeted pest species are having adverse effects on native lizard populations.

D8 Summary

This Habitat Enhancement Plan (HEP), alongside the main LMP and Pest Mammal Management Plan (PMMP), aims to protect Canterbury grass skinks salvaged from areas impacted by vegetation clearance associated with the Project. This HEP details measures to create, restore, and maintain suitable habitat to support the successful relocation of native lizards within designated relocation sites. Key measures to protect native lizards include enhancement planting, placement of rock and log refugia, and pest plant and animal control. These measures aim to increase the lizard carrying capacity of the relocation sites through the provision of food, shelter, basking areas, and protection from predators in accordance with DOC guidance for lizard salvage and transfer.

The restoration works will be implemented through a (minimum) five-year programme. Site preparation, including pest plant control and refugia placement will take place prior to lizard relocation to ensure suitable habitat is available. Planting will occur from May to September, with monitoring undertaken over the October to April period each year. Monitoring will assess plant survival, pest plant and animal pressures, and overall habitat condition. Follow-up pest plant and animal control will be undertaken over the same period where required, with infill planting completed during the following May to September planting season where enhancement planting losses exceed 10%.

An adaptive management approach will be followed throughout the programme. If proposed monitoring identifies reduced habitat quality or increased pest activity, management methods will be reviewed and adjusted in consultation with NZTA and DOC.

D9 References

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Weedbusters New Zealand. (n.d.). *Weed information and control methods.* Retrieved November 28, 2025, from https://www.weedbusters.org.nz/

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Appendix E Pest Mammal Management Plan

E1 Introduction

E1.1 Purpose and scope

This Pest Mammal Management Plan (**PMMP**) has been prepared to detail pest mammal control and monitoring measures proposed for the relocation sites receiving native lizards salvaged from the Package 2 construction area. Pest mammal control will improve the quality and carrying capacity of lizard habitat at the relocation site, and will be implemented in such a way as to avoid or minimise the risk of injuring or disturbing resident lizards. This PMMP addresses the following conditions:

- Measures for pest mammal control and pest mammal monitoring for a period of 5 years after establishment of release areas (condition WA.2 v.1).
- Measures to avoid and minimise disturbance to resident lizards within the release areas (condition WA.2 v.2).

This PMMP provides pest mammal control and monitoring measures for the Barkers Road lizard release site (Figure Appendix E.1).

Figure Appendix E.1: Barkers Road lizard relocation site and contingency release site (indicative area).

E1.2 Associated documents

This PMMP should be read in conjunction with the relevant documents listed below:

- State Highway 1 North Canterbury—Woodend Bypass Project (Belfast to Pegasus) - Substantive Application - Ecological Impact Assessment (EcIA) (T+T, 2025).
- State Highway 1 North Canterbury – Woodend Bypass Project (Belfast to Pegasus) – Lizard Management Plan (LMP) (T+T, 2026a).
  - Appendix D: Habitat Enhancement Plan (HEP) (T+T, 2026b).
  - Appendix E: **[THIS PMMP]**.
- State Highway 1 North Canterbury – Woodend Bypass Project (Belfast to Pegasus) – Construction Environmental Management Plan (EMP) (T+T, 2026c).
- Lizard Management Plan for Belfast to Pegasus (Woodend Bypass) Road of National Significance - Early Works (Wildland Consultants, 2025) (LMP for Wildlife Act Authority 119946-FAU)).
- Package 1 Wildlife Act Authority [119946-FAU].
- Package 2 Wildlife Approval [TBC] Resource Consent [TBC].

E1.3 Responsibilities and competencies

Key responsibilities and competencies of relevance for the delivery of, and compliance with, this PMMP are detailed in Appendix E Table 1.

Appendix E Table 1: Roles and responsibilities for the implementation of this PMMP

Organisation	Contact	Responsibilities and competencies
NZTA (Project Owner/Permit holder)	XXX	• Reading the PMMP and understanding the implications for the wider project. This includes overseeing the implementation of the PMMP at a high level. • NZTA are required under the Wildlife Approval [XXX] and the LMP to implement this PMMP.
NZTA or Main Contractor (Project Manager)	XXX	• Coordinates communication between the Pest Control Contractor and Project Herpetologist. • Reading and understand this PMMP.
XXX (Main Contractor/Construction Site Manager)	XXX	• Delivery of and compliance with the LMP, PMMP and HEP. • Implementation of the LMP, PMMP and HEP including the following: – Reading and understanding the LMP, PMMP and HEP. – Facilitating a project start-up meeting with the Project Ecologist(s) before construction commences. – Contacting the Project Herpetologist a minimum of one month before any potential lizard habitat areas are scheduled for clearance. – Maintaining clear lines of communication with the Project Herpetologist regarding changes to the works schedule. • Briefing new personnel about the contractor's responsibilities under the LMP, PMMP and HEP.

Organisation	Contact	Responsibilities and competencies
XXX (Project Herpetologist)	XXX	The Project Herpetologist is the lead ecologist named on the Project's WAC. They are to be engaged by the Project Owner to provide technical advice to the Pest Control Contractor and to assist the Project Manager with compliance with this PMMP. The Project Herpetologist will: • Provide technical support to Project Owner and the Pest Control Contractor to implement this PMMP.
XXX (Project Ecologist(s))	XXX	Project Ecologists includes the Project Herpetologist and all ecologists working under the supervision of the Project Herpetologist to support compliance with this PMMP.
XXX (Pest Control Contractor(s))	XXX	• Delivery of works outlined in this PMMP. • Reading and understanding this PMMP. • Communicating with Project Owner and the Project Herpetologist. • Carrying out the pest mammal control programme, including maintaining the traps, bait stations, and signage. • Reporting of pest mammal control performance metrics. • Communicating with the Project Herpetologist and Project Owner if any changes are required through the adaptive management process. • Suitably qualified to undertake pest mammal control. • Briefing new personnel about responsibilities under this PMMP. • Must hold appropriate certifications and competencies for the pest control tools being used.
XXX (Restoration Contractor(s))	XXX	• May be one or more contractors at the discretion of the Project Owner. • Delivery of, and compliance with the HEP (Appendix D of the LMP). • Reading and understanding the responsibilities detailed in the HEP. • Communicating with Project Manager, the Project Herpetologist and the Pest Control Contractor. • Communicating with the Project Herpetologist and Project Manager if any changes are required through the adaptive management process.

E1.4 Timing and duration

The Project Herpetologist will direct pest mammal control to be implemented within the Barkers Road relocation site at least three months prior to the site's activation (where possible). The duration of pest mammal control will be specific to each relocation site, with control continuing for five years from the date that the final lizard is relocated to each site. As such, the overall duration may be longer than five years for some sites. Any changes to the timing and duration of pest mammal control will be reviewed and approved by DOC prior to implementation.

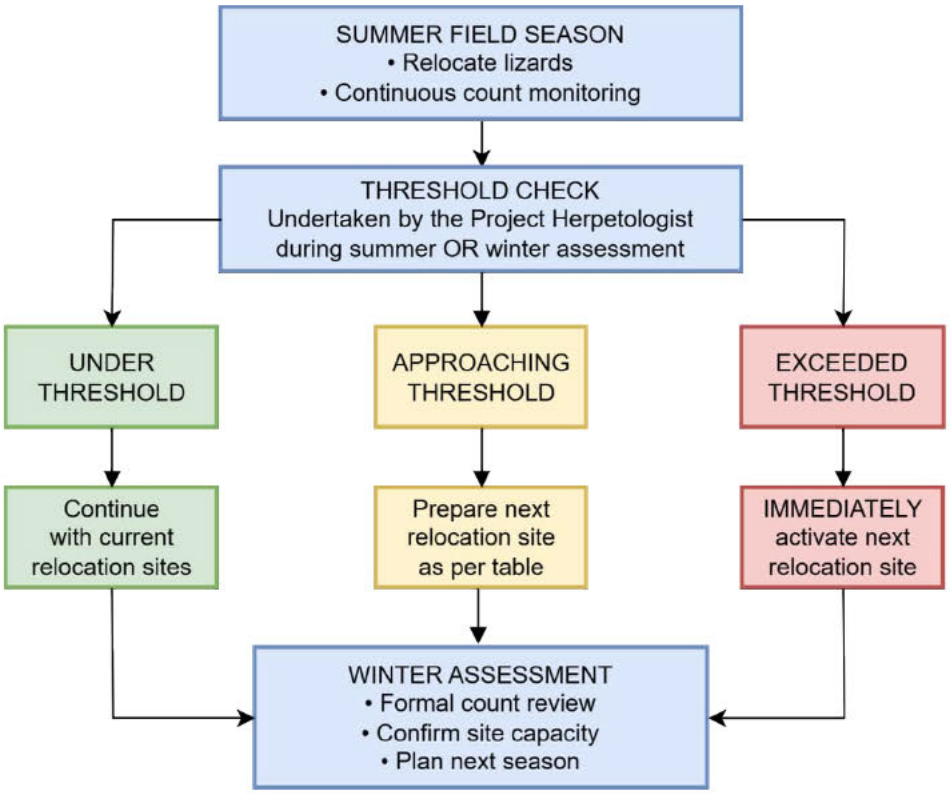

Figure Appendix E.2: Lizard relocation site activation flow chart (thresholds provided in Appendix E Table 2).

Appendix E Table 2: Lizard relocation site activation thresholds

Lizard threshold	Barkers Road (A)	Barker's Road (B)
1 – 1,000	✓	×
1,001-1,500	✓	✓

Note: See Figure 2.1 flow chart for the threshold implementation process.

E2 Pest control areas

Pest control will be undertaken at the Barkers Road relocation sites as detailed in Section E1.4. The relocation site management areas are shown in Figure Appendix E.1 and include the following land parcels:

- Barkers Road (Site A) relocation site: Lot 1 DP 359788 and Lot 2 DP 359788 (1.32 ha).
- Barkers Road (Site B) relocation site: Lot 1 DP 423296 and Lot 2 DP 423296 (4.50 ha).

All pest mammal management areas are in a Rural Zone under the Waimakariri District Plan and do not include any Significant Natural Areas (SNAs). Detailed descriptions of the habitat present in the relocation sites is provided in the LMP for Package 2 (T+T, 2026a).

E3 Target pest mammal species

A summary of the target pest mammal species and their impacts on native lizards is provided in Appendix E Table 3 below. Control of species that can have an adverse impact on planting establishment (rabbits, hares, and pūkeko) is documented in the HEP (Appendix D).

Appendix E Table 3: Summary of targeted pest mammal species and their impacts on native lizards and planting establishment

Pest animal species	Impacts
Hedgehogs	Hedgehogs are mainly insectivorous, but will eat almost any animal product including mice, lizards, frogs, and the eggs and chicks of ground-nesting birds and domestic fowl (Jones, 2021). A study in Otago recorded high levels of predation on native skinks, concluding that large numbers of hedgehogs can have a high impact on native reptile populations (Spitzen-van der Sluijs et al., 2009).
Mustelids	Weasels, stoats, and ferrets prey upon a wide variety of species. Rats, rabbits, mice, and birds are staples, but they also eat other fauna including, lizards, fish, frogs, and invertebrates (King & Veale, 2021; Garvey & Byrom, 2021; King & Murphy, 2021). Native lizard remains have frequently been found in the stomach contents of captured mustelids, and stoats have been linked to local skink population declines (Reardon et al., 2012).
Mice	Mice are omnivorous and are known to take advantage of whatever food sources become available to them, including invertebrates and lizards. Mice have been observed attacking adult skinks, and native skinks can comprise a significant portion of their diet (Norbury et al., 2014). Mice can also increase in numbers where rat-specific pest control is undertaken.
Possums	Possums are often found in areas of both indigenous and exotic vegetation, and will also forage in open, grassy areas at night. Possums eat a wide variety of trees and shrubs, as well as the eggs and chicks of birds, and invertebrates including snails (Sweetapple et al., 2004; Glen et al., 2011). They can also damage newly planted trees and shrubs.
Rats	Ship rats (*Rattus rattus*) are among the most widespread mammals on the New Zealand mainland, inhabiting forests, towns, cities and farms (Russell & Innes, 2021). They are also omnivorous generalists known to predate on native animals including lizards (Russell & Innes, 2021). Norway rats (*Rattus norvegicus*) are also likely to be present due to the coastal proximity and the numerous surrounding waterbodies (Russell & Innes, 2021). These omnivorous rats are the largest of New Zealand's rat species and are known to predate upon vulnerable native animals such as frogs, lizards, wetland birds and seabirds (Russell & Innes, 2021).

E4 Pest mammal management measures

The proposed pest control measures have been developed in general accordance with the existing pest mammal management implemented under the LMP for Package 2 (T+T, 2026a) and in the procedures detailed in the DOC Practical Guide to Trapping (DOC, 2023). Management measures are designed to target mice, rats, hedgehogs, and mustelids which pose the greatest threat to native lizards in the relocation sites. Possum trapping may also be implemented if signs of possum activity are observed (e.g. droppings, scratch marks).

Proposed measures are also designed to avoid and minimise disturbance to resident lizards within the relocation sites as follows:

- Restoration and Pest Control Contractors will follow designated paths through the relocation sites to minimise the disturbance of lizards inhabiting grassed areas.
- Pest plant control, habitat enhancement activities, and the installation of pest mammal control devices will be undertaken concurrently to reduce the overall duration of habitat disturbance.

- No vegetation clearance will be undertaken for the enablement of trapping and baiting operations unless absolutely necessary. If clearance is required, Pest Control Contractors will used hand tools only.

The implementation of any additional or altered management measures will be at the discretion of the Pest Control Contractor in accordance with the adaptive management methods detailed in Section E6.1.

E4.1 Bait stations

Rats and mice will be controlled using poison baits in ground-based lockable bait stations in a grid format of 25 × 25 m which will be filled and pulsed intermittently using a combination of brodifacoum and diphacinone bait blocks. The selected model of bait station will prevent bait access by dogs (e.g. Protecta Evo Ambush, run-through, or similar type) and will ideally be anchored to trees, or to posts where no suitable trees are present.

A summary of the poison types, bait stations setups, poisoning programme, and signage requirements is provided in Appendix E Table 5. A map showing indicative bait station locations is provided in Figure Appendix E.3, and a detailed pest control programme is provided in Appendix E Table 4. Note that Appendix E Table 4 shows an indicative bi-monthly bait station fill schedule which should be shifted to align with the first month in which pest mammal management occurs.

Appendix E Table 4: Bi-monthly trapping and bait station fill schedule

Month – Week	Bait stations*	DOC 200 and 250 traps
Month 1 – Week 1	Day 1 – Fill Day 4 – Restock Day 7 – Restock	Day 1 – Checked and reset Day 4 – Checked and reset Day 7 – Checked and reset
Month 1 – Week 2	Day 14 – Restock	Day 14 – Checked and reset
Month 1 – Week 3	Day 21 – Restock	Day 21 – Checked and reset
Month 1 – Week 4	Day 28 – Empty	Day 28 – Checked and reset
Month 2 – Week 1	-	-
Month 2 – Week 2	-	Between Day 14 and Day 21 – Checked and reset
Month 2 – Week 3	-	
Month 2 – Week 4	-	

* Brodifacoum for first month, diphacinone for all future fills.

Figure Appendix E.3: Bait station and trap location plan.

Appendix E Table 5: Poison application details

Aspect	Methodology
Bait station type	Lockable bait stations will be placed at ground level across the relocation sites according to the following approximate numbers: • Barkers Road (Site A) relocation site: 83 • Barkers Road (Site B) relocation site: 34
Bait station locations	• Lockable bait stations will be placed in a 25 m × 25 m grid, as shown in Figure Appendix E.3 (indicative locations only). They will be at least 2 m in from the edge of roads and walking tracks. They will also be anchored to trees or to temporary posts where no trees are available. GPS coordinates and station condition will be recorded.
Bait type	• Wax blocks with either brodifacoum or diphacinone as the active ingredient for rat and mice bait stations.
Bait application frequency	• Bait stations will be filled with brodifacoum blocks (3–5 blocks) at the start of the appropriate month (i.e. three months prior to Main Works salvage). Stations will be checked and restocked every three days for the first week, then checked and restocked weekly for a total of four weeks from when the bait is first deployed. Bait will be removed after four weeks and prior to the next fill month. This comprises the first pulse. • Following the initial bait station pulse, the bait formula will change to diphacinone blocks, with stations filled according to the same methodology from the start of every second month (e.g. August, October, December etc.).
Signage	• Warning signs will be erected and dated each day of bait application at public access points in accordance with WorkSafe signage requirements for vertebrate toxic agents. Signs will be left in place for the entire length of pest control operations. • Bait stations will be labelled with "Danger, Poison Warning" stickers. • Following completion of pest mammal control, brodifacoum signs will be left in place for a period of 12 months, and diphacinone signs will be left in place for a period of 8 months.
Maintenance	• The condition of bait stations will be recorded during activities. Damaged bait stations will be replaced upon the next visit to site. • Signage will be checked each visit and replaced where required.

E4.2 Trapping

Traps will be used to target mustelids, rats, hedgehogs across the lizard relocation sites. A summary of the trap types, trap layouts, programme, and signage requirements are provided below in Appendix E Table 6. Detailed indicative maps of trap locations are provided in Figure Appendix E.3, and a detailed pest control programme is provided in Appendix E Table 4.

Appendix E Table 6: Trap use details

Aspect	Methodology
Trap type	Trapping will utilise alternating DOC 200 and DOC 250 traps (or similar). Traps will be fitted with Weka-length tunnels (i.e. 535 mm) to reduce the risk to domestic cats.
Trap locations	Traps will be placed at 100 m intervals around the perimeter of each area. Traps will also be positioned at ground level and out of sight from the public where possible. GPS coordinates and station condition will be recorded.
Trap lure	Lures will be used in all traps. Lures could include Erayz dried rabbit meat, fresh eggs, or salmon terracotta lure. Specific lures may be alternated at the discretion of contractors undertaking the work should trapping prove ineffective.
Trap check frequency	Traps will be checked and cleared/reset each time bait stations are refilled, and at least every three weeks, with any dead pests buried or removed and disposed of appropriately.
Signage	At the entrance to the vehicle access road off Barkers Road between the two Barkers Road relocation sites, warning signs will be erected stating that traps are present in the area. Signs will be left in place for the entire duration of pest control operations associated with the Project.
Maintenance	The condition of traps will be recorded during activities. Damaged traps will be replaced upon the next visit to site. Signage will also be checked each visit and replaced where required.

E5 Pest mammal monitoring

The relatively small size of the pest control area (5.82 ha) means that there is unlikely to be any beneficial statistical analysis that can be done with monitoring data. However, an annual monitoring round using tracking tunnels is proposed to provide an index of rodent activity prior to lizard monitoring being undertaken. Two lines of 10 tracking tunnels will be established within the relocation area. Tunnels will be placed at 10 m spacing to better detect mice and will be baited with peanut butter. Tunnels will be run for one night in early summer, two weeks following removal of toxic bait from bait stations. Waiting for two weeks will make the monitoring more accurate as it ensures that any rodents that have consumed bait will have died prior to monitoring.

In addition to the snapshot index of rodent density provided by tracking tunnels, all trap kills and bait-take information will be recorded and used as a monitoring tool to gain insights into predator activity and abundance on-site. This information will be used to inform the pest control methods detailed in Section E4 following the adaptive management methodology detailed in Section E6.1. Specific monitoring will include records of:

- The total weight of poison bait added and removed from each bait station.
- The number of each species of animals killed at each trap.
- Observations of pest mammal activity (e.g. damage to vegetation, carcases, scat) in the control area with the date and location noted.

E6 Reporting

Reporting of monitoring data to the Project Owner will be undertaken annually in November and will include monitoring results specified in Section E5. The report will be prepared by the Pest Control Contractor.

The annual report will also include details of the pest mammal control undertaken during the annual monitoring period and any changes made from the previous year to improve the efficacy of control. The report will include any other observations made by the pest control contractors of relevance to pest mammal management. Recommendations for changes to the program to improve performance such as increasing the frequency or intensity of management measures will also be made where monitoring indicates a low or reduced efficacy of management measures.

A database will be established and implemented for the duration of the control period; this can be done on Trap.nz. This database will be GIS tagged for each trap. At every inspection, all details on trap kills, repair, and replacement of lure will be logged.

E6.1 Adaptive management

An adaptive management approach, such as outlined in the EIANZ Guidelines (Roper-Lindsay et al., 2018) for Ecological Impact Assessments, will be adopted for pest mammal management methods to respond to new knowledge and unexpected events. The adaptive management framework will address the uncertainty associated with the response of fauna to management allowing flexibility in methods and approaches where needed to reach the best ecological outcomes. The following triggers and management measures will apply based on bait-take and trap monitoring data:

- <10% of bait remaining across the site on the final check of a month will trigger an additional bait station fill.
- >75% of traps capturing animals will trigger an additional check one week later where one is not already scheduled.

If bait-take and trapping data suggests high pest mammal populations are sustained over an extended period, an adaptive management approach will be implemented to prevent adverse effects to lizards. The methods or approaches will be varied based on experience and research to achieve a level of control appropriate for the protection of lizards. This may also include increasing the range of control targeted species should monitoring indicate that non-targeted pest species are having adverse effects on native lizard populations. Additionally, an adaptive management approach will also require bait formulations be alternated periodically to reduce bait shyness.

Bait take from bait stations is expected to fluctuate throughout the year. Pulsing reduces the risk of bait shyness developing within pest mammal populations. However, if bait take becomes reduced despite abundant evidence of pest mammals, a pulse of brodifacoum will be implemented before returning to diphacinone for the subsequent pulses.

E7 Summary

This PMMP details a management programme designed to provide protection for native lizards across the Package 2 lizard relocation sites (Barkers Road Site A and Site B). Delivery of, and compliance with this PMMP will be the responsibility of NZTA who will liaise with the Project Herpetologist and the Pest Control Contractor to implement this PMMP. The pest control program has been designed to target pest mammal species identified as posing the greatest threat to native lizards. The programme utilises a combined approach of bait stations and trapping to target rodents, hedgehogs, and mustelids across the relocation sites.

Pest mammal control must commence three months before the lizard relocation sites are utilised.

It is expected that the control of these species will improve the likelihood of survival for relocated native lizards. Monitoring will be based on bait-take, trap kill records, and other observations made by the contractor during the implementation of the control programme. Records of bait-take and trap kills will be presented and discussed in an annual report to assess the efficacy of the control

programme, and an adaptive management approach will be adopted to ensure the programme remains effective over time.

E8 References

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Appendix F Authorised personnel skills and experience

B2P Woodend Role	Name	Experience				Bio	Key Lizard Survey and Salvage Skills
		Project	Role	WAA Permit Number	Date of Onset		
Lead Herpetologist	Dr. Rieke Behrens (PhD)	Tonkin + Taylor National Lizard Survey Permit	Herpetologist	107472-FAU (named)	12/07/2024	Rieke is a terrestrial ecologist and environmental scientist. She holds a Diplom (a German University Degree which is equivalent to a Master Degree) in Landscape Ecology and a PhD in Environmental Management from Lincoln University. Rieke has gained lizard management skills on a range of large to small scale projects nationwide, including lead herpetologist for the O Mahurangi Penlink motorway projects in Auckland. Since working for T+T for the last 10 years, she has prepared a number of Lizard Management Plans (LMP), implemented these and LMPs prepared by others. She has surveyed and salvaged lizards using a range of methods including artificial cover objects, funnel and pitfall traps, manual searching including spotlighting and machine-assisted salvage. Rieke has experience in capturing, identifying, transporting and releasing lizards into relocation sites. Rieke is named as authorised personnel on many other WAAs, including permit numbers 97642, 96137, 122647, 122608, 118010, 118020, 111514. Rieke is also named personnel on T+T's national lizard survey permit 107472-FAU. Rieke is member of the NZ Society for Research of Amphibians and Reptiles. • Management Plans Authored or Contributed to: – Mahurangi Penlink: Lizard Monitoring Plan – Rawene Landslide Remediation: Lizard Management Plan – Kainga Ora – LEAD Alliance: Lizard Management Plan	• Artificial Cover Object Deployment • Manual searching • Pitfall Trapping • Funnel Trapping • Nocturnal Spotlighting • Post-relocation monitoring • Tracking Tunnel Surveying
		O Mahurangi Penlink	Lead Ecologist	97642-FAU (named)	9/11/2022		
		Auckland Council – Rawene Slip Remediation	Lead Ecologist	96137 – FAU (named)	29/03/2022		
		Auckland Council – Motions Meola	Lead Ecologist	122647 – FAU (named)	28/01/2026		
		Transpower – Tower relocation	Lead Ecologist	122608-FAU (named)	19/09/2025		
		Auckland Council – Blue Green Network - Harania	Lead Ecologist	118010-FAU (named)	19/12/2024		
		Auckland Council – Blue Green Network – Te Ararata	Lead Ecologist	118020-FAU (named)	19/12/2024		
		Kainga Ora – Piritahi/LEAD Alliance	Lead Ecologist	111514-FAU (named)	12/09/2024		
		Nelson City Council – Matai flood protection	Project ecologist	120075-FAU (not named)	26 August 2025		
		Auckland Regional Landfill	Project Ecologist	103551-FAU (not named)			
Lead Herpetologist	David Pickett (BSc)	Tonkin + Taylor National Lizard Survey Permit	Herpetologist	107472-FAU (named)	12 July 2024	David has nine years' consulting experience in terrestrial ecology at locations across New Zealand. David has conducted lizard survey and salvaging across Waikato, Manawatu, Wellington, Nelson, Canterbury, Southland, and the West Coast. David's lizard survey experience includes the use of artificial refuges (ARs), pitfall traps, manual searches, nocturnal spotlighting, systematic arboreal searches, funnel traps, CCFC's and machine assisted salvage. David's lizard survey and salvaging experience has involved a variety of species including copper skinks, minimac gecko, Raukawa gecko, Waitaha gecko, moko kakariki/barking gecko, ngahere gecko/mokopirirakau, forest gecko, glossy brown skink, Northern grass skink, Southern grass skink, West Coast green gecko, *Oligosoma* aff. *newmani* "Westland". More recently, David has taken opportunities to work with, and learn from, Marieke Lettink (Herpetologist) – referral letter can be provided upon request. From 2020 - 2023 David was the Lead Project Ecologist for Te Ahu a Turanga: Manawatū Tararua Highway (Manawatū) and has undertaken and overseen all lizard-related search, salvage and monitoring over this period. Work on this project included establishment of the relocation site, skink monitoring using ACOs, gecko monitoring through spotlighting and CCFC's, and a plague skink incursion management plan. More recently David has authored and implemented numerous large scale Lizard Management Plans including those for Silverstream Landfill (Wellington), Tupua Horo Nuku seawall shared user path (Wellington), and Transpower ING-WAI transmission line (West Coast – Denniston). David has designed lizard surveys and implemented management plans for various other small projects across the North and	• Artificial Cover Object Deployment • Manual searching (inc. diurnal arboreal) • Pitfall trapping • Funnel trapping • Nocturnal spotlighting • Post-relocation monitoring • Tracking tunnel surveying • Machine assisted salvage
		Hutt City Council - Silverstream Landfill	Lead Herpetologist	107260-FAU (named)	9 Oct 2023		
		NZTA - Manawatū Tararua Highway	Lead Ecologist	90044-FAU (not named)	13 Jan 2021		
		NZTA - Te Ara o Te Ata – Mt Messenger Bypass	Project Ecologist	107349-FAU (not named)	31 Aug 2023		
		NZTA - Petone to Grenada (NZTA)	Lead Project Ecologist	107472 (named)	5 Feb 2025		
		NZTA - Tupua Horo Nuku	Lead Herpetologist	107283 (named)	9 Feb 2024		
		Transpower NZ Ltd - Waimangaroa to Inangaua	Lead Herpetologist	Under Marieke Lettink's survey permit	-		
		Transpower NZ Ltd – Weka Pass	Herpetologist	120159 (named)	12 Sept 2025		
		Harmony Energy New Zealand - Carterton Solar Farm	Lead Herpetologist	107472-FAU (named)	12 July 2024		

B2P Woodend Role	Name	Experience				Bio	Key Lizard Survey and Salvage Skills
		Project	Role	WAA Permit Number	Date of Onset		
		Private Developer - Manor Park	Herpetologist	100737-FAU (named)	21 Dec 2022	South and routinely provides advice to clients regarding their obligations to protect these taonga under the Wildlife Act.	
		Fletcher Construction Ltd - Hamilton Bypass WEX	Project Ecologist	50889-FAU (not named)	20 Sept 2016		
		Tasmin Mill's West Valley Landfill permit	Herpetologist	122698-FAU (named)	2 Dec 2025		
		Christchurch City Council - Onuku Landfill Remediation, Banks Peninsula	Project Ecologist	97864-FAU (not named)	9 May 2022		
		Nelson City Council – Matai flood protection	Project Ecologist	120075-FAU (named)	26 Aug 2025		
Lead Herpetologist	Dr. Christopher Woolley (PhD)	Nelson City Council – Matai flood protection	Project Ecologist	120075-FAU (named)	26 Aug 2025	Christopher has 8 years' experience in working herpetology and ecology in New Zealand. He has experience surveying and monitoring reptiles using a variety of methods, including live trapping (pitfall, Gee's minnow), terrestrial and arboreal artificial cover objects, spotlighting and manual search. He has led and collaborated on research related to lizard breeding ecology (Oligosoma suteri), population monitoring (O. polychroma, O. aeneum, O. ornatum, O. kokowai, O. aff. polychroma Clade 5), urban lizard conservation, and the management of lizards during land use. As a contract herpetologist he has been involved in survey, salvage, and post-translocation monitoring of skinks. Christopher is a member of the Society for Research on Amphibians and Reptiles in New Zealand. Management Plans authored: • Carterton Solar Farm LMP (draft) • COL-OTI-A Pole replacement LMP (draft)	• Artificial cover object deployment • Manual searching • Pitfall trapping • Funnel trapping • Nocturnal spotlighting • Post-relocation monitoring • Tracking tunnel surveying • Machine-assisted salvage
		Massey Seawall	Herpetologist	117912-FAU (not named)	5 Feb 2025		
		Silverstream Landfill	Herpetologist	107260-FAU (not named)	9 Oct 2023		
Lead Herpetologist	Sam Heggie-Gracie (MSc)	Wellington City Council – Massey Road Seawall Renewals	Herpetologist	117912-FAU (named)	5 Feb 2025	Sam holds a MSc in Biosecurity and Conservation and has nine years' experience as an ecological consultant. Sam is experienced in undertaking lizard salvaging on large construction projects such as the Pūhoi to Warkworth Motorway, Matawii Water Storage Reservoir and O Mahurangi - Penlink. Sam's experience surveying skinks and geckos has included a number of techniques including spotlighting, manual habitat searching, construction-assisted salvaging, tracking tunnels, Artificial Cover Objects (ACOs), pitfall trapping, Visual Encounter Surveys, closed cell foam covers, tree ACOs, eDNA surveys and funnel trapping. Sam's experience includes survey or management of various species including copper skink, ornate skink, northern and southern grass skink, striped skink, egg-laying skink, moko skink, shore skink, McCann's skink, Mackenzie skink, Raukawa gecko, forest gecko, elegant gecko, Pacific gecko, and Southern Alps gecko, with training experience from herpetologists Dr. Matt Baber and Dr. Graham Ussher. Sam has also undertaken monitoring and habitat mapping of Hochstetter's frogs with Dr. Matt Baber and herpetologist Dylan Van Winkel. Sam has authored Lizard Management Plans including those for large construction projects such as Te Ahu a Turanga: Manawatū Tararua Highway, Te Ara o Te Ata – Mt Messenger Bypass and Auckland Regional Landfill. Sam holds a personal lizard survey permit for the Auckland region (117239-FAU) and is listed on the Tonkin & Taylor national survey permit (107472-FAU). Specifically with relation to salvage projects, Sam was named as an authorised herpetologist and has involved or lead projects of varying complexity. Sam is a Certified Environmental Practitioner – General (CEnvP) and has a Certificate in Tikanga (Mātauranga Māori) Level 3.	
		Hutt City Council - Silverstream Landfill	Lead Herpetologist	107260-FAU (named)	9 Oct 2023		
		NZTA - Manawatū Tararua Highway	Lead Ecologist	90044-FAU (not named)	13 Jan 2021		
		NZTA - Te Ara o Te Ata – Mt Messenger Bypass	Project Ecologist	107349-FAU (not named)	31 Aug 2023		
		NZTA - Petone to Grenada (NZTA)	Lead Project Ecologist	107472 (named)	5 Feb 2025		
		NZTA - Tupua Horo Nuku	Lead Herpetologist	107283 (named)	9 Feb 2024		
		Transpower NZ Ltd - Waimangaroa to Inangaua	Lead Herpetologist	Under Marieke Lettink's survey permit	-		
		Transpower NZ Ltd – Weka Pass	Herpetologist	120159 (named)	12 Sept 2025		
		Harmony Energy New Zealand - Carterton Solar Farm	Lead Herpetologist	107472-FAU (named)	12 July 2024		

B2P Woodend Role	Name	Experience				Bio	Key Lizard Survey and Salvage Skills
		Project	Role	WAA Permit Number	Date of Onset		
		Private Developer - Manor Park	Herpetologist	100737-FAU (named)	21 Dec 2022		
		Fletcher Construction Ltd - Hamilton Bypass WEX	Project Ecologist	50889-FAU (not named)	20 Sept 2016		
		Tasmin Mill's West Valley Landfill permit	Herpetologist	122698-FAU (named)	2 Dec 2025		
		Christchurch City Council - Onuku Landfill Remediation, Banks Peninsula	Project Ecologist	97864-FAU (not named)	9 May 2022		
Other Herpetologist	Dr Liz Curry (PhD)	Te Ara o Te Ata – Mt Messenger Bypass	Project Ecologist	107349 (not named)	31 August 2023	Liz is a Principal Terrestrial Ecologist and Technical Director for Terrestrial Ecology at Tonkin & Taylor. Liz has 20 years of national and international experience and has led ecology components of several major multi-disciplinary transport, waste, energy and infrastructure projects (pre, during and post construction phases), including lizard management aspects. Liz has experience in the survey, assessment, and effects management of indigenous lizard species and their habitats across a range of environments. This includes undertaking habitat assessments, baseline surveys, with a focus on identifying potential effects on lizard populations and recommending appropriate effects management measures. Liz has experience surveying various New Zealand skink and gecko species (e.g. copper skink, Northern grass skink, Canterbury grass skink, Raukawa gecko, forest gecko and Pacific gecko) using a range of techniques, including spotlighting, manual habitat searches, construction-assisted salvaging, tracking tunnels, Artificial Cover Objects (ACOs), pitfall trapping, Visual Encounter Surveys, closed cell foam covers, tree ACOs, nocturnal surveys, and funnel trapping. Liz has authored several Lizard Management Plans and associated compliance reports for a range of projects and technically reviews other LMPs prepared by other T+T ecologists. Liz is named on several project Wildlife Act Authorities nationwide.	• Artificial Cover Object Deployment • Manual searching • Pitfall Trapping • Funnel Trapping • Nocturnal Spotlighting • Tracking Tunnel Surveying • Salvage, including machine assisted salvage • Post-relocation monitoring
		Fletcher Construction Ltd – Waikato Expressway Hamilton Section	Project Ecologist	50889-FAU (not named)	20 Sept 2016		
		Waikato Expressway Rangiriri, Cambridge and Longswamp sections	Project Ecologist	XXXX-FAU (not named)	2016-2017		
		Nelson City Council – Matai / Hanby Park flood protection	Project Ecologist	120075-FAU (named)	26 Aug 2025		
		Transpower NZ Ltd – Weka Pass	Project ecologist	120159 (named)	12 Sept 2025		
		Southern Landfill, WCC	Project ecologist	114761-FAU (named)	5 September 2024		
		Auckland Regional Landfill	Project Ecologist	103551-FAU (named)			
Other Herpetologist	Dr. Jamie Mackay (PhD)					Jamie has over 10 years' experience as a consultant ecologist and has extensive experience preparing and reviewing lizard management plans for projects ranging from small subdivisions to large infrastructure projects. He is experienced at surveying for lizards using ACOs, tracking tunnels, closed cell foam covers, spotlighting, and hand searching. Jamie's handing experience includes copper skink, ornate skink, moko skink, striped skink, and Pacific gecko. He has also used sticky traps for lizard survey and salvage on Great Barrier Island when managing the plague skink eradication feasibility assessment for Auckland Council.	• Artificial Cover Object Deployment • Manual searching • Nocturnal Spotlighting • Tracking Tunnel Surveying • Salvage, including machine assisted salvage • Post-relocation monitoring
Other Herpetologist	Nicki van Zyl (MSc)	Nelson City Council – Matai / Hanby Park flood protection	Herpetologist	107472-FAU (named)	12 July 2024	Nicki holds an MSc in Zoology and brings over seven years of terrestrial ecology experience across New Zealand. She has extensive experience conducting lizard salvage for major infrastructure projects, including the Mount Messenger Bypass (Taranaki) and O Mahurangi – Penlink (Auckland), as well as numerous smaller developments across Hamilton, Auckland, East Cape, New Plymouth, Rotorua, Wellington, Nelson, and Wānaka. In addition to executing field operations, she has authored numerous	• Artificial Cover Object Deployment • Manual searching • Pitfall Trapping
		Maitai/Hanby Park	Project Ecologist	120075 (named)	26 August 2025		

B2P Woodend Role	Name	Experience				Bio	Key Lizard Survey and Salvage Skills
		Project	Role	WAA Permit Number	Date of Onset		
		Tasmin Mill's West Valley Landfill permit	Project Ecologist	122698 (named – fully authorized)	2 December 2025	Lizard Management Plans (LMPs) and is highly adept at implementing mitigation strategies proposed by herself and other ecological experts. Her technical expertise spans a comprehensive range of survey methods, including spotlighting, manual habitat searching, construction-assisted salvage (machine assisted), tracking tunnels, Artificial Cover Objects (ACOs), and both pitfall and funnel trapping. Nicki has experience in identification and handling of diverse native herpetofauna, including copper, ornate, northern grass, Otago, and grand skinks, alongside Pacific, forest, and Auckland green geckos. Furthermore, Nicki has a strong background in *ex-situ* conservation management. She has worked closely with tuatara, Otago and grand skinks, and several gecko species (Auckland green, elegant, and Duvaucel's geckos) at facilities including Pūkaha Mount Bruce, the West Coast Wildlife Centre, and Queenstown Kiwi Park. Lizard Management Plans authored or contributed to: • Waimangaroa Transmission Line • Weka Pass	• Funnel Trapping • Nocturnal Spotlighting • Tracking Tunnel Surveying • Machine Assisted Salvage
		O Mahurangi Penlink	Project Ecologist	97642-FAU (not named)	9 November 2022		
		Hamilton Southern Links	Project Ecologist	107472 (named)	12 July 2024		
		Weka Pass	Project Ecologist	120159 (named)	12 September 2025		
		Te Ara o Te Ata – Mt Messenger Bypass	Project Ecologist	107349 (not named)	31 August 2023		
		Spedding Land Company	Project Ecologist	107478 (named)	3 November 2023		
		HCC IAF Reservoir	Project Ecologist	107472 (named)	12 July 2024		
Other Herpetologist	Sam Mulcock (BSc)	Te Ara o Te Ata – Mt Messenger Bypass	Project Ecologist	107349-FAU (not named)	31 August 2023	Sam has a BSc in Environmental Science and Biological Sciences and has 4 years of experience in ecology in New Zealand. Sam has been involved in lizard surveys and salvage for small and large projects across the country. Sam's lizard surveying experience includes spotlighting, manual habitat searching, pitfall trapping, tracking tunnels, Artificial Cover Objects, and machine assisted salvage on construction/development sites, as well as population monitoring within pest free sanctuaries. Sam has worked with a number of species including canterbury grass skink, northern grass skink, McCanns skink, copper skinks, ornate skinks, shore skinks, striped skinks, glossy brown skinks, raukawa geckos, elegant geckos, goldstripe geckos, Waitaha gecko, pacific geckos, and Forest geckos.	• Artificial Cover Object Deployment • Manual searching • Pitfall Trapping • Funnel Trapping • Nocturnal Spotlighting • Post-relocation monitoring • Tracking Tunnel Surveying • Machine assisted salvage
		O Mahurangi Penlink	Project Ecologist	97642-FAU (named)	9 November 2022		
		Blue Green Network – Harania	Project Ecologist	118010-FAU (named)	19 December 2024		
		Silverstream Landfill	Project Ecologist	107260-FAU (not named)	9 Oct 2023		
		Weka Pass	Project Ecologist	120159 (named)	12 September 2025		
		Maitai/Hanby Park	Project Ecologist	120075 (named)	26 August 2025		
		Spedding Land Company	Project Ecologist	107478 (named)	3 November 2023		
Personnel under the supervision of Lead Herpetologist	Shaun Morgan (BSc)	Tonkin + Taylor National Survey Permit	Herpetologist	107472-FAU (named)	30 January 2026	Shaun has a MSc in Environmental Science and over five years of experience in ecology in New Zealand. Shaun has been involved in lizard surveys and salvages across multiple projects in the Auckland and Manawatu regions. Survey and salvaging techniques have included pitfall trapping, funnel trapping, spotlighting, manual habitat searching, artificial cover objects, tracking tunnels, and machine-assisted salvaging. Shaun has prepared lizard monitoring plans for an Auckland project involving the relocation of copper skinks, and for a Nelson project involving the relocation of northern grass skinks. He has also prepared multiple pest mammal management plans implemented primarily for lizard protection purposes. Shaun has handled copper skink, ornate skink, forest gecko and elegant gecko. Shaun also participated in T+T's 2022 internal lizard workshop, covering ACO, gecko spotlighting, and manual searching methods (Instructor: Stephanie Angove-Emery, permitted lizard ecologist for the Auckland region).	
		Auckland Council – Blue Green Network – Harania	Project Ecologist	118010-FAU (named)	19 December 2024		
		Auckland Council – Blue Green Network – Te Ararata	Project Ecologist	118020-FAU (named)	19 December 2024		
		O Mahurangi - Penlink	Project Ecologist	97642-FAU (not named)	9 November 2022		
		Rawene Reserve landslip	Project Ecologist	96137-FAU (not named)	25 September 2025		
		Kainga Ora – Piritahi/LEAD Alliance	Project Ecologist	111514-FAU (not named)	12 September 2024		
		Seaside Park Coastal Protection	Project Ecologist	94939-FAU (not named)			

B2P Woodend Role	Name	Experience				Bio	Key Lizard Survey and Salvage Skills
		Project	Role	WAA Permit Number	Date of Onset		
		Auckland Regional Landfill	Project Ecologist	103551-FAU (not named)			
		Manawatū Tararua Highway	Project Ecologist	90044-FAU (not named)	13 January 2021		
Personnel under the supervision of Lead Herpetologist	Ashleigh Johnston (MSc)					Ashleigh holds an MSc in Ecology and is a Christchurch-based ecologist with nine years' experience working in the public, crown research and private sectors in New Zealand and Tonga. While Ashleigh specialises in marine ecology, biosecurity and aquaculture, she also has considerable experience in terrestrial ecology, specifically with herpetofauna (trained by Dr Marieke Lettink) and avifauna. Ashleigh is experienced working within large-scale and small-scale ecological projects, undertaking Assessment of Environmental Effects (AEEs) and conducting habitat assessments and biodiversity surveys (marine ecology, birds and lizards). Ashleigh is proficient at identifying ecological issues, writing technical reports, developing and implementing ecological management plans (including lizard and bird management plans), applying for project-specific Wildlife Act Authority and designing small scale monitoring programmes and mitigation packages. Ashleigh has worked on large infrastructure projects and assisted with small long-term monitoring projects involving complex ecological issues, so is well placed to advise on achieving good environmental outcomes and pragmatic solutions.	
Other Herpetologist	Dr Tarryn Wyman (PhD)	Tonkin + Taylor National Lizard Survey Permit	Herpetologist	107472 FAU – Named	12 July 2024	Tarryn is an Ecologist with over ten years' post graduate experience working in a range of environmental consultancy, advisory and analytical roles, both in New Zealand and the U.K. Tarryn holds a PhD in Ecology from the University of Canterbury. As a Certified Environmental Practitioner (CEnvP), Tarryn's high professional standards are recognised by the Environmental Institute of Australia and New Zealand. Tarryn's wide ranging practical experience in terrestrial ecological systems and technical background have led her to hold key roles on several large infrastructure projects throughout New Zealand. Tarryn has led the lizard management on many of these projects, including conducting lizard habitat assessments and lizard surveys, preparing lizard management plans and Ecological Impact Assessments, obtaining project-specific Wildlife Act Authorities, leading lizard salvages, and designing monitoring programmes. This has exposed her to a range of lizard species and industry-standard methods. Tarryn has experience undertaking lizard surveying and salvaging using a variety of techniques including spotlighting, pitfall traps, gee minnow traps, manual habitat searching, construction-assisted salvaging, artificial cover objects, closed cell foam covers, and tracking tunnels. This work has been carried out on construction projects such as the Manawatū Tararua Highway, Mt Messenger Bypass, O Mahurangi – Penlink, Silverstream Landfill (107260-FAU), Spicer Landfill, Southern Landfill (114761-FAU), KiwiRail Tunnel 1 (107270-FAU), Massey Road seawall renewal (117912-FAU), Houghton Bay retaining wall renewal (111487-FAU), Weld Road bridge/pathway (114767-FAU), and Otaki to North Levin highway (118286-FAU). Tarryn has volunteered for the Whitireia Park Restoration Group who run a long-term lizard monitoring programme, where she took part in pitfall trapping and ACO checks, including handling of copper skinks, raukawa geckos, and northern grass skinks and undertook training from Angus Hulme-Moir. She also participated in a lizard training course run by Marieke Lettink (Fauna Finders) in November 2023, to upskill in lizard handling, identification and processing, and use of different survey methods, including catching lizards from artificial retreats (ACOs), identifying lizard sign and presence in rocky areas, extracting geckos from crevices, and visual searching for arboreal geckos. Lizard Management Plans Authored: • Southern Landfill • Spicer Landfill • KiwiRail Tunnel 1 • Houghton Bay	
		Southern Landfill	Lead Ecologist	114761-FAU - Named	5 September 2024		
		Silverstream Landfill	Herpetologist	107260-FAU - Named	9 October 2023		
		Spicer Landfill	Lead Ecologist		2021		
		Ruamahanga River	Lead Ecologist		2022		
		KiwiRail Tunnel 1	Lead Ecologist	107270-FAU - Named	26 September 2023		
		Massey Road seawall renewals	Lead Ecologist	117912-FAU - Named	6 February 2025		
		Weld Road bridge/pathway	Herpetologist	114767-FAU - Named			
		Manor Park	Herpetologist	100737-FAU - Named	22 December 2022		
		Houghton Bay	Lead Ecologist	111487-FAU - Named	3 September 2024		
		Ōtaki to north of Levin (Ō2NL)	Herpetologist	118286-FAU - Named			
		O Mahurangi - Penlink	Herpetologist	97642-FAU (not named)	9 November 2022		
		Te Ara o Te Ata – Mt Messenger Bypass	Project Ecologist	107349 (not named)	31 August 2023		
		Manawatū Tararua Highway	Project Ecologist	90044-FAU (not named)	13 January 2021		

B2P Woodend Role	Name	Experience				Bio	Key Lizard Survey and Salvage Skills
		Project	Role	WAA Permit Number	Date of Onset		
		Te Awa Karangi Flood Resilience Project	Project Ecologist		2021		
Personnel under the supervision of Lead Herpetologist	Joshua Forest (BSc)					Joshua is an Ecologist at T+T with 10 years of practical experience in in-situ and ex-situ fauna management. Joshua holds a BSc in Ecology and Biodiversity from Victoria University of Wellington. Having worked in both central and local government and consulting, Joshua has a wide-ranging understanding of the entire environmental system, and a pragmatic approach to ecological projects. Joshua is proficient at identifying ecological issues, carrying out biodiversity surveys and habitat assessments, writing technical reports, developing and implementing ecological management plans, and designing monitoring programmes and mitigation packages.	
Personnel under the supervision of	Cid Shearman (BSc)					Cid has a BSc (hons) in Ecology with over 10 years working in the field of ecology and conservation. She has worked across the UK and Aotearoa as a consultant ecologist, with a particular interest in reptiles and amphibians. In the field Cid has worked in the UK with adder, grass snake, common lizard, slow worm, natterjack toad and great crested newt (holding a Natural England licence to handle and survey great crested newts), including working on a UK great crested newt swabbing project for Chytrid fungus. In NZ Cid has worked with a number of gecko and skink species, including Kahurangi gecko, Nelson green gecko, and northern grass skink. Cid has experience in a number of survey methods (both from the UK and in NZ), including spotlighting, manual habitat searching, construction-assisted salvage (machine assisted), tracking tunnels, Artificial Cover Objects (ACOs), pitfall and funnel trapping (gee-minow). In addition, Cid has experience working with loggerhead sea turtle in Greece and spending a summer working with adults in a rehabilitation centre.	
Personnel under the supervision of Lead Herpetologist	Matt Barson (BSc)	Silverstream Landfill	Herpetologist	107260-FAU (not named)	9 October 2023	Matt holds a BSc in Environmental Science focusing on Ecology and has over 7 years experience working in the industry, having worked oversees and in Aotearoa New Zealand. Matt has been involved in lizard surveys and salvage for projects in the Wellington and Horizons regions. Matts lizard surveying experience includes a variety of techniques, such as spotlighting, manual habitat searching, artificial cover objects, tracking tunnels, funnel trapping, and machine assisted salvage. Matt has experience in capturing, transporting, identifying, weighing, measuring, and safely releasing copper skink, northern grass skink and raukawa gecko to release sites.	
		Southern Landfill	Herpetologist	114761-FAU (not named)	5 September 2024		
		Houghton Bay	Herpetologist	111487-FAU (named)	3 September 2024		
		Ōtaki to north of Levin (Ō2NL)	Herpetologist	118286-FAU (named)			
Personnel under the supervision of Lead Herpetologist	Tyler Eaton-Palmer (BSc)	Te Ara o Te Ata – Mount Messenger	Project Ecologist	107349-FAU (not named)			
		O Mahurangi - Penlink	Project Ecologist	97642-FAU (not named)			
		Ōtaki to north of Levin (Ō2NL)	Project Ecologist	118286-FAU (not named)			
		Petone to Grenada	Project Ecologist	Not named			
		OceanaGold – Waihi operation	Field Ecologist	Not named			
		Rawene Reserve Landslip	Project Ecologist	Not named			
Personnel under the supervision of Lead Herpetologist	Paul Dyer (BSc)	Tonkin + Taylor Tasmin Mill's West Valley Landfill permit	Project Ecologist	122698-FAU (named support Ecologist)	2 December 2025	Paul holds a BSc (Tech) in Ecology and Biodiversity with a minor in Animal Behaviour and brings over two years of experience as an ecological consultant. He has conducted herpetofauna surveys for both large and small-scale projects across the Auckland, Waikato, Bay of Plenty, Taranaki, Manawatū-Whanganui, and Wellington regions. His technical expertise encompasses a variety of survey methods, including spotlighting, manual habitat searching, tracking tunnels, funnel trapping, machine-assisted salvage, closed cell foam covers, and the	
		Te Ara o Te Ata – Mount Messenger	Project Ecologist	107349-FAU (not named)	31 August 2023		

B2P Woodend Role	Name	Experience				Bio	Key Lizard Survey and Salvage Skills
		Project	Role	WAA Permit Number	Date of Onset		
		Auckland Regional Landfill	Project Ecologist	103551-FAU (not named)	17 May 2023	use of Artificial Cover Objects (ACOs). In the field, Paul has worked with diverse native species, including copper skinks, northern grass skinks, Pacific geckos, and forest geckos. Paul is also experienced in identifying and handling exotic plague skinks. Additionally, he has gained specialised experience surveying Hochstetter's frog populations alongside herpetologists Dr. Matt Baber and Marc Choromanski. Paul is currently named as a support ecologist on Wildlife Act Authority (WAA) permit 122698-FAU. Lizard management plans authored: Motions Meola Closed Landfill: Lizard Management Plan	
		Otaki to North of Levin (O2NL)	Project Ecologist	118286-FAU (not named)			
Personnel under the supervision of Lead Herpetologist	Danielle Cairns					Danielle is an ecologist holding a Masters of Science (First Class Honours) in Environmental Science. She has over 5 years experience as an ecologist for Tonkin + Taylor. Danielle has worked in ecological monitoring, water quality, erosion and fish passage roles prior to joining Tonkin + Taylor. In her time at Tonkin + Taylor she has been involved in a variety of projects including freshwater and terrestrial ecology. These projects have included ecological impact assessments, compliance monitoring and reporting, construction ecology, fauna management, preparation of management plans, various field assessments and GIS analysis and mapping. Danielle has experience with herpetofauna including monitoring and salvage of native skink, gecko and frog species.	
Personnel under the supervision of Lead Herpetologist	Laura Francis					Laura has an MSc majoring in Environmental Science and Biology and has over five years' experience working as an ecological consultant in terrestrial and freshwater environments. In terrestrial environments, Laura has undertaken vegetation surveys, wetland delineation, cryptic wetland bird surveys, terrestrial bird nest checks, five minute bird counts, lizard salvage, and long-tailed bat surveys. Laura's herpetofauna survey experience includes hand searching for geckos and skinks, use of artificial cover objects, pitfall traps and spotlighting. These surveys have been based in the Auckland and Waikato regions. Laura recently became certified in the identification of high-risk bat roost trees and is working towards her occupied roost watching, and ABM deployment and data analysis certifications. She recently spent a week in Whirinaki Forest Park radio tracking long-tailed bats, conducting occupied bat roost dusk watches, and handling long-tailed bats.	
Personnel under the supervision of Lead Herpetologist	Ruby Leeves (BEnvSci (Hons))	Tonkin + Taylor National Survey Permit	Herpetologist	107472-FAU	12 July 2024	Ruby has a BEnvSci (hons) in Ecosystem Health and Biodiversity and started working full-time with T+T in February 2025.Prior to joining full time, Ruby spent two summers and university breaks as an intern at T+T and gained valuable lizard handing experience during this time. In particular, she has been involved in salvage, relocation, and monitoring of lizards on the O Mahurangi Project (WAA 97642-FAU) and Harania project as part of the Blue Green Network (WAA 118010-FAU). She has handled and measured ornate skinks, copper skinks, northern grass skinks, forest geckos, and elegant geckos. She has experience setting and checking traps, undertaking manual searching, and gecko spotlighting.	• Artificial Cover Object Deployment • Manual searching • Pitfall Trapping • Funnel Trapping • Nocturnal Spotlighting • Tracking Tunnel Surveying • Machine Assisted Salvage • Safe handling and release
		O Mahurangi (Penlink)	Project Ecologist	97642-FAU (not named) 97642-FAU variation on 13/05/26 (named)	9 November 2022		
		Silverstream Landfill	Project Ecologist	107260-FAU (not named)	9 October 2023		
		Blue Green Network - Harania	Project Ecologist	118010-FAU (not named)	19 December 2024		
		Blue Green Network – Mahunga Dr	Project Ecologist	118120-FAU (not named)	19 December 2024		
		Blue Green Network – Debris trap	Project Ecologist	118120-FAU (not named)	19 December 2024		
		Petone to Grenada	Project Ecologist	107472 (unsure whether named or not)	12 July 2024		
		Meola reserve	Project Ecologist	122647-FAU	28 January 2026		

B2P Woodend Role	Name	Experience				Bio	Key Lizard Survey and Salvage Skills
		Project	Role	WAA Permit Number	Date of Onset		
		Rawene Reserve landslip	Project Ecologist	96137-FAU (named)	25 September 2025		

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