Boffa Miskell

Tauriko West – Tupenga Improvements

Lizard Management Plan

Prepared for NZTA

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1.0 Introduction

1.1 Project background

The Tauriko West – Tupenga Improvements Project (Figure 1) is intended to improve connectivity between the Port of Tauranga, the Upper North Island, and key growth areas in the Bay of Plenty. The Project focuses on upgrades to State Highway 29 (SH29) and State Highway 29A (SH29A), which form part of the Western Corridor transport network connecting Tauranga with Hamilton and the wider region. The Project is located in the western Bay of Plenty, within the Tauriko West growth area on the western edge of Tauranga. It will separate national and regional through-traffic from local movements, improve travel time reliability and safety, and provide network resilience that supports planned housing and employment growth within Tauranga's Western Corridor.

The Project extends generally from the SH29 Ōmanawa Road intersection in the west, through Tauriko West and the Tauriko Business Estate, and east toward the Barkes Corner intersection, including connections with Takitimu Drive and the Takitimu North Link interchange.

The Project will require the clearance of a range of potential lizard habitats. A lizard survey was undertaken as part of the Assessment of Ecological Effects by Boffa Miskell Limited. This survey detected copper skinks (*Oligosoma aeneum* – At Risk – Declining) in one area, and the non-native plague skink (*Lampropholis delicata*) across the site. It is probable, due to the low densities, cryptic nature, and the low detection probability of survey methods available that copper skinks are present sporadically and at low density within other areas of the alignment as well.

As part of the ecological effects management package a Lizard Management Plan (LMP) is proposed, to ensure native lizard species that may be present on site are protected from habitat destruction and disturbance of the proposed project and the effects on their habitat are managed.

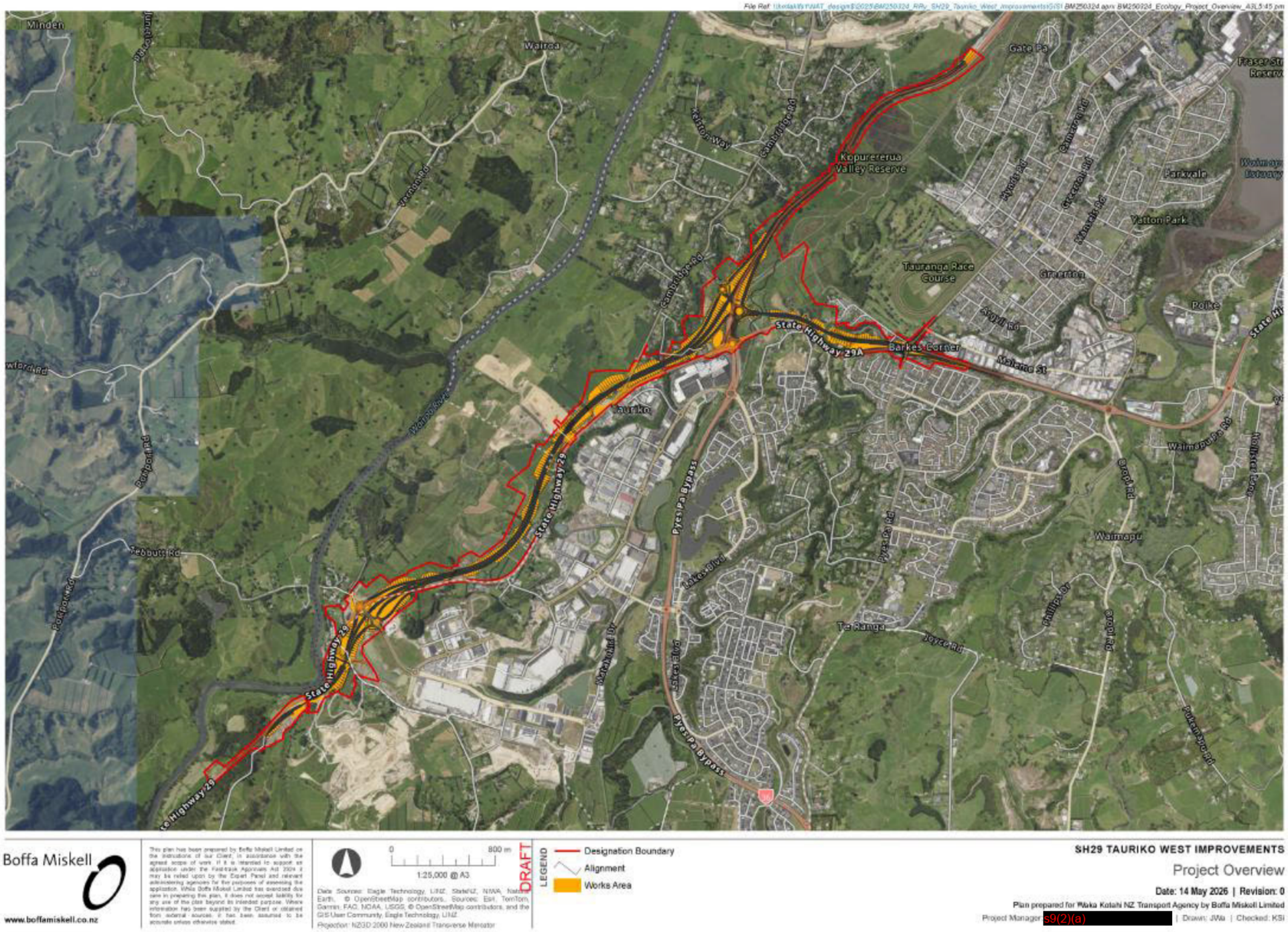


Figure 1: Tauriko West - Tupenga Overview Plan

1.2 Ecological context

The Project is located within the Tauranga Ecological District (TED) which has had an estimated 92% loss of original indigenous vegetation with only 8% remaining (van Meeuwen-Dijkgraaf et al., 2009).

Terrestrial vegetation surveyed in the proposed designation was predominantly exotic in composition with only occasional common native species present. Predominant land cover is pasture, ornamental gardens and exotic or exotic dominated scrub. Most native species are confined to either areas of planting (landscape/amenity or restoration planting) or areas of mixed / exotic-dominated regeneration.

1.3 Report scope

This Lizard Management Plan (LMP) has been developed for the Tauriko West – Tupenga Project (the Project) and outlines the methods that will be used to manage the adverse effects on native lizards as a result of the construction of the Project. The LMP sets out the requirements for:

- The survey, capture and relocation of native lizards that may be present within the Project site; and
- The enhancement of the lizard relocation site to ensure long-term survivability of any relocated specimens.

1.4 Goals and Objectives of Lizard Management

The goal of the management proposed within this LMP is to minimise the injury and mortality of native lizards within the areas of vegetation clearance associated with the Project.

The objectives required to meet this goal are:

- Identify suitable lizard habitats.
- Undertake lizard surveys to establish presence of native lizards.
- Prioritise areas for salvage methods and effort.
- Undertake lizard salvage before and during vegetation clearance.
- Translocate native lizards to a secure and protected area.
- Create and enhance lizard habitat within the release area .

1.5 Lizard management approach

The lizard management approach is to undertake salvage activities for all lizard habitats that are going to be impacted by the Project. A lizard release site has been identified in a portion of Recreation Reserve land associated with Tauranga Racecourse, that is administered by Tauranga City Council. It is legally described as Part Allot 25 Te Papa PSH (RT:624214). The release site will be managed and enhanced in accordance with this LMP. Salvaged lizards are to be relocated into the release site.

This LMP has been developed in accordance with the guidelines provided in the 'Key principles for lizard salvage and transfer in New Zealand' (Department of Conservation, 2019).

2.0 Lizard values

Based on the available habitats, a review of the New Zealand Herpetofauna Bioweb database, the land use history of the proposed designation corridor, and the lizard survey, copper skinks are the native lizard most likely to be encountered.

2.1 Potential species present

The DOC BioWeb herpetofauna database shows copper skink (*Oligosoma aeneum*) and moko skink (*Oligosoma moco*) have been found in the local area. However, the database contains a distinct lack of records for geckos or skinks across the entirety of the Western Bay of Plenty. This is likely a reflection of a lack of survey overall. In our opinion the absence of more cryptic species in the database are not a reliable indicator of their potential presence or lack thereof in the Project area.

Based on the habitat present, geographic range of lizard species, and experience in similar landscapes, we consider the following species to be potentially present in the area[1]:

- Copper skink (*Oligosoma aeneum*), *at-risk – declining;* habitat generalist that prefers dense and complex habitats. Persists in both urban and rural environments.
- Moko skink (*Oligosoma moco*), *at-risk – relict*; Coastal and lowland inhabiting open habitats such as rank grassland, forest clearings and edges, and scrubland. Persists in peri urban and rural environments normally restricted to areas close to the coast.[2]
- Ornate skink (*Oligosoma ornatum*), *at-risk - declining*; cryptic species preferring damp thick leaf litter, rock piles and dense vegetation. Persists in the urban and rural environment. This species has not been confirmed in the Western Bay of Plenty between Tauranga and Waihi.
- Striped skink (*Oligosoma striatum*) *at-risk – declining*; Typically inhabits dense native lowland podocarp forest and assumed to be primarily arboreal. However, can be found as relict populations in farmland that was once forested where it typically inhabits moist humid sub habitats found amongst shelterbelts, dense weed field such as pampas, under logs and in rank grass.
- Crenulate skink (*Oligosoma robinsoni* syn *Oligosoma aff. infrapunctatum "crenulate")*, *at-risk – declining;* inhabits dense scrub, shrubland, grassland and forest edges.
- Plague skink (*Lampropholis delicata*) an invasive, non-native, species occupying most farmland, peri urban, and urban habitats.

[1] Threat statuses are aligned with Hitchmough et al. (2021) and habitat preferences follows that described within Van Winkel, Baling, & Hitchmough (2018):

[2] Kessels and Associates Ltd (2017) excluded this species from their assessment however, moko skink, are, albeit infrequently, found further inland in the types of habitats available in the alignment area. Such a detection has occurred in 2014 at the very southern end of Wainui South Road nearby.

Based on the woody vegetation communities present we do not consider it likely that arboreal geckos will be present within the footprint.

2.2 Ecological value of habitats present for native lizards.

An ecological impact assessment (EIA) prepared by Boffa Miskell Limited (2026) identified potential lizard habitat within all areas of vegetation that was not pasture or horticulture. The assessment found that most of the habitat has undergone historical clearance and continued modification for pastural grazing and/or orchards. This disturbance has reduced habitat quality and will have negatively impacted any resident populations present at the time. Pest animal signs as well as domestic cats were notably common across the entirety of the Project footprint which would indicate a high level of predation pressure for any lizard population present.

Overall, the vegetation within the Project area has many physical habitat attributes that would provide habitat value to native lizards. However, the disturbance history and threats such as pest animal predation have significantly degraded this value and that the Project area is therefore unlikely to be important for native lizard populations.

Of the potential native species present in the Project footprint, copper skinks are considered to be the most likely to be present in the greatest numbers as this species tends to be the most resilient and adaptable of the native species potentially found in the area. They are also the most common species found in the modified environments nearby[3]. Copper skinks are one of the most common native lizards in the North Island and are known to inhabit a wide variety of habitats from rank grass to forested areas (Van Winkel et al., 2018). All other potentially present native lizards could be present at very low densities, likely below survey detection limits.

Any copper skinks present in the area are expected to be in generally low densities due to predation by mammalian predators and the site's long history of disturbance (including ongoing maintenance/modification of pastoral grazing and crop production land). Taking into consideration the At Risk – Declining threat status of copper skinks this species has a **High** ecological value. The ecological value of habitats for native lizards on site has been assessed as Negligible, Low and Low-Moderate. The ecological value is assessed based on the Environment Institute of Australia and New Zealand (EIANZ) impact assessment guidelines (Roper-Lindsay et al., 2018).

2.3 Lizard survey

2.3.1 Method

Lizard surveys were undertaken using artificial cover objects (ACOs) to attempt to establish the presence of native lizards on site. We deployed a total of 45 ACOs (five at each site) within areas of potential habitat on 24 October 2025, and then checked for lizards, scat and slough four times on 20 January, 02 February, 11 March, and 30 April 2026, when weather was suitable[4].

[3] Based on DOC Bioweb database, personal experience in the Tauranga / Western Bay of Plenty area (Andrew Blayney).

[4] While surveys should be carried out during the warmer months when lizards are their most mobile, ACOs should not be checked during hot/sunny weather as they become too hot and are unlikely to be occupied. As such, surveys were carried out on mild, overcast days to increase the likelihood of occupancy.

The locations of the ACOs are mapped within Appendix 1.

2.3.2 Results

Three native lizards were observed during lizard surveys; two identified as copper skinks, and one that was not definitively identified[5] but also was likely a copper skink. All three native lizards were observed at Survey Site 4 in the roadside vegetation alongside SH29A, under ACOs 7, 9 and 10 (Map 1).

Approximately 60 plague skinks were observed during surveys (on/under ACOs as well is within the surrounding vegetation), as well as six unidentified skinks that moved too quickly to identify.

Copper skinks only being observed at one location during surveys does not prove their absence in other areas within the proposed designation, though it may indicate that native lizards are not present in high numbers generally within the Project footprint.

Map 1: Red points show locations of copper skink observations under ACOs alongside SH29A. Green points are ACOs where indigenous lizards were not observed.

[5] Based on size, colouring and markings it was clearly not a plague skink and was identified as native.

3.0 Effects on lizards

We have considered the effects of the Project on herpetofauna at the local scale. This differs from the assessment scale used for all other elements of ecology (vegetation features, more mobile fauna, and the aquatic environment), because the biology and life history of copper skinks (the key species of potential impact from the Project) means they readily inhabit small, spatially discrete patches and are not easily mobile between these features. Therefore, impacts at small scales have commensurately more severe effects than that of effects on vegetation features, other more mobile fauna, and the freshwater environment.

The potential effects on herpetofauna from the construction and operation of the Project relate to mortality and injury of lizards during vegetation clearance and earthworks. The permanent loss of lizard habitat; and modification of remaining lizard habitat is addressed in the conditions of the resource consents required for the earthworks required for the Project. The most likely species present and therefore impacted by the Project is the copper skink (*at-risk* declining). It is unlikely that detectable densities of other *at-risk* or *threatened* species are present.

Mortality and injury to copper skinks during construction could result in the loss of a moderate proportion of the copper skinks present in this area and therefore we assess this as having the potential to cause a **Moderate** magnitude of effect on the copper skink populations likely present in the Project footprint.

We consider operational effects of the Project on both the copper skink population and habitat are likely to be limited as the proposed road occurs in a modified landscape where the habitats present already have a high degree of fragmentation and disturbance. The Project does not introduce a barrier to movement of herpetofauna that does not already exist due to the existing SH29 and SH29A alignment. Overall, we assess the magnitude of potential effect as **Negligible**.

4.0 Lizard salvage, transfer, and release

4.1 Process and habitats

Lizard salvage will not be undertaken during winter months as indigenous lizards undergo physiological changes during the colder months (i.e., torpor: a state of semi-hibernation). Therefore, lizard salvage will only be undertaken between October and April when they are more active. Warmer weather and higher activity levels mean that lizards are easier to detect and catch. During this time, relocated lizards also have an increased chance of surviving.

The capture and translocation measures shall be implemented for all potential native lizard microhabitats (Table 2) within the non-pasture vegetation present within the project site. The salvage of microhabitats will be based on a staged salvage prioritisation process which responds to initial survey findings to appropriately determine the salvage effort in any one location.

The basic stages and hold points for the lizard salvage for non-pasture vegetation are set out in Table 1, and detailed in Sections 5.1 to 5.6.

Table 1: Salvage steps, hold points, and roles and responsibilities.

Step	Roles and responsibilities.
Pre-clearance activities	
Identification of suitable lizard microhabitats.	Project constructor to identify areas of potential earthworks, clearance, plant, and equipment storage, or otherwise disturbance throughout the Project footprint. Project herpetologist to carry out identification of potential lizard habitat.
Establish ACOs with pitfall traps (closed) underneath them in suitable microhabitats. At least two months prior to potential vegetation clearance.	Project herpetologist to carry out deployment of survey devices.
Check ACOs and open pitfall traps and then proceed to check these devices for five consecutive days (four nights).	Project herpetologist to carry out survey/salvage.
Salvage effort prioritisation.	Project herpetologist to prioritise areas for subsequent salvage activities based on capture rates and onsite observation of habitat and conditions.
Hold point and Decision Point 1	Project herpetologist to communicate next stages with project constructor and associated team. Map to be provided of areas that are: • Clear from continued salvage requirements – incidental discovery process applies. Cleared for clearance and construction. • Requires targeted destructive salvage by hand. Not cleared for clearance or construction.
Destructive salvage hand searching.	Project herpetologist to undertake destructive hand searching and salvage.
Hold point and Decision Point 2	Project herpetologist to communicate next stages with project constructor and associated team. Map to be provided of areas that are: • Clear from continued salvage requirements – incidental discovery process applies. Cleared for clearance and construction. • Requires machine assisted destructive salvage. Not cleared for clearance or construction without supervision of project herpetologist. Constructor and herpetologist to organise required plant and assistance to complete salvage requirements.
Clearance activities	
Machine assisted destructive salvage.	Project herpetologist and constructor to carry out machinery assisted destructive salvage under the supervision and direction of the Project herpetologist.
Hold point	Project herpetologist to confirm with constructor areas of completed salvage and communicate the areas are clear from continued salvage requirements – incidental discovery process applies.

Step	Roles and responsibilities.
Pre-clearance activities	
Reporting	Project herpetologist to report to constructor, NZTA and DOC on results of salvage. Provide a map and summary of actions undertaken and captures.

Table 2: Native lizard micro-habitat types to be cleared.

Micro-habitats	Focus areas
Hedges with dense understory	Occasional leaf litter, rank grass, and woody debris.
Exotic shelterbelt	Patches of dense undergrowth, leaf litter and woody debris. Occasional artificial debris.
Tree stand	Occasional leaf litter, long grass, and woody debris.
Artificial debris	Wood piles, compost heaps, old roofing materials, etc.
Pampas & flax	Dense build-up of leafy debris.
Rank grass	Dense cover within rank grass, often in association with wetland edges, stream edges, and shelterbelts.
Damp leaf litter	Build ups of damp leaf litter under exotic or native vegetation.
Dense ornamental gardens	Complex habitats providing cover and refugia.
Complex, damp indigenous or exotic vegetation	Areas of damp refugia and build-up of vegetative debris.

5.0 Salvage activities

Salvage activities will step sequentially through Sections 5.1 to 5.6.

5.1 ACOs and Pitfall trapping.

ACOs and pitfall traps (lid closed under ACOs) must be set at least six weeks before being checked to allow any potential lizards on site to habituate to the equipment. Methods should follow the guidance provided in The Herpetofauna inventory and monitoring toolbox (Department of Conservation, 2012). Prior to being checked the pitfall traps will be baited with soft fruit (e.g., banana, canned pear, or mango) and a water-soaked sponge and the lids removed. Given this is a salvage operation, a high density of traps is required. This density will need to be determined by the experienced herpetologists carrying out the survey in response to habitat complexity and area. The density used must ensure a high capture rate of any native lizards on site. The salvage operation will involve a minimum of four checks over five consecutive days (each trap checked once in the morning).

Trapping shall continue until there are no captures in a location for a minimum of three consecutive nights. After three consecutive nights of no capture has been achieved, the salvage process can proceed. Trapping will be the priority for lizard salvage of ground dwelling native skinks. Followed by hand searching and destructive habitat searches for areas where vegetation is proposed to be cleared. The salvage operations will be done during the lizard survey season (October – April).

For some species, pitfall trapping can have very limited success compared to hand searching. If ACOs and pitfall trapping results in very low trapping rates consideration will be given to discontinuing those methods and immediately transitioning to the more effective hand searching and mechanically assisted destructive salvage.

5.2 Decision point 1

Following the survey steps in response to the capture rates and types of habitats encountered the project herpetologist will be required to classify areas into the following two categories:

- Areas that are clear from continued salvage requirements as there is unsuitable habitat and no captures; and
- Areas that require targeted destructive salvage by hand.

Those areas that have been classified as clear will be subject to the incidental discovery protocol whereas those areas identified for destructive salvage will continue to progress through the salvage process.

5.3 Hand searching

Targeted destructive manual searches of vegetation (prior to mechanically assisted vegetation clearance) will include raking litter, hand clearance of herbaceous vegetation or leaf debris at the base of vegetation and overturning of large debris. This will be carried out by a minimum of two ecologists at each location to maximise the chance of capturing indigenous lizards.

5.4 Decision point 2

At this point, based on the results of the salvage and survey efforts detailed in sections 5.1 to 5.3, the prioritisation of subsequent actions needs to take place. Areas where indigenous lizards have been found and/or salvaged will be targeted by mechanically assisted destructive salvage (Section 5.5), as well as those areas not feasible to survey or salvage by hand[6]. Those areas where no indigenous lizards were found will be subject to incidental discovery protocols.

5.5 Mechanically assisted destructive salvage

Habitats that can't be effectively searched by hand and where indigenous lizards have been found will be searched with the assistance of an excavator (or any other suitable equipment). There is a potential that lizards may flee or be revealed during vegetation removal (e.g., movement of large objects such as logs). Clearance is best achieved with an excavator with a thumb attachment on the bucket that can pick up debris and pull apart dense cover in a slow and controlled fashion, or in some areas with a rake attachment that can pull back ground cover with much less risk of crushing. Note: communication with machinery contractors is key to ensuring that lizard salvage is carried out in such a way as to minimise risk to lizards (i.e., gradual habitat clearance).

[6] These areas may be too dense, contain large heavy debris unable to be lifted unassisted, or otherwise requiring mechanical dismantling (for example large dense pampas).

Following mechanically assisted destructive salvage the site must be devoid of lizard habitat and be able to be further cleared or earthworks progressed without the supervision of the herpetologist.

5.6 Management of post search debris

There are several potential fates of the post search debris such as vegetation and wood including the immediate disposal or the mulching of the debris. However, in instances where debris are to be stockpiled onsite the project herpetologist must deploy ACOs around the debris pile which must be checked, and any native lizards salvaged prior to the subsequent movement or disposal of the debris. Debris piles which have been in place for greater than 12 weeks and adjacent to retained habitat must be treated following the full salvage methodology outlined above as native lizards may migrate into the dense cover provided by the debris pile from surrounding areas.

Preferably, vegetation and debris (if clean organic debris) will be deposited in areas to be retained adjacent to existing vegetation and left to naturally decay.

6.0 Incidental discovery protocol

Should any lizards[7] be detected incidentally within cleared vegetation or during vegetation clearance when the herpetologist isn't present, an exclusion area (10m radius) with clear signage will be established around the area and the herpetologist contacted to further search the area. Any further vegetation clearance works will cease within the exclusion area until the area has been cleared for vegetation removal by the qualified herpetologist.

7.0 Lizard transportation

The procedures outlined below must be followed for the transfer of indigenous lizards to minimise the stress involved of being captured and relocated.

- Lizards must be transferred between capture and release habitats in appropriately sized, well-ventilated containers with secure lids. The storage container must be cleaned and thoroughly disinfected prior to use and will contain habitat elements (cover objects) to reduce stress (e.g., leaves, sticks, soil or grass). Handling will be minimised to ensure they do not become stressed.
- While contained, lizards will be kept in a cool place and transferred the same day as capture to the approved release site.
- Lizards from each area shall be stored separately to reduce stress and the likelihood of possible overcrowding and territorial/dominance behaviours.

[7] The exotic plague skink is also likely present, however the identification to species level is best left to an expert and this management approach must be followed.

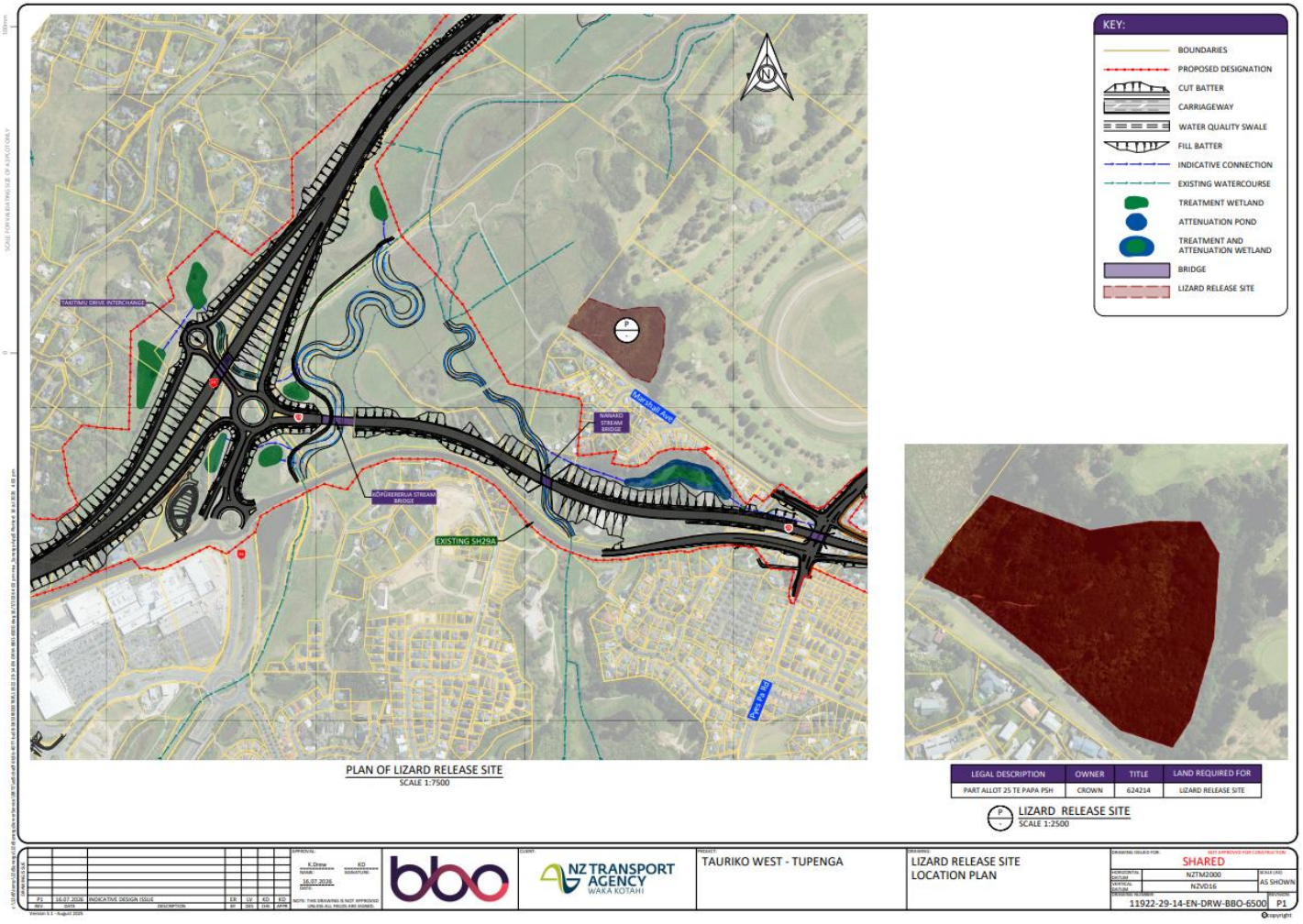
- Lizards are to be released into suitable microhabitats such as log piles, and good covering of leaf litter which will be provided within the soft release pens of the release site.
- Captured lizards are to be released one at a time, and not at the exact same location to minimise stress from overcrowding and territorial/dominance behaviours (release locations also dependent on the number of lizards captured).

8.0 Release site

A release site is to be established within woody vegetation in the Kōpūrererua Valley, at the bottom of Marshall Avenue (Map 2) and all salvaged lizards will be relocated there.

This release site was selected based on the following:

- It is in close proximity to areas of vegetation clearance and central relative to the wider designation (around 100 m from the nearest point of the designation, and between Takitimu Drive and SH29A). This reduces lizard transfer time, and thus potential exposure to stress levels. Proximity of the release site also ensures lizards are exposed to the same climatic conditions and have familiarity with surrounding habitats and will very likely be from the same sub-population.
- Ability to accommodate lizards within habitats similar or ecologically better to those from which they are likely to be captured. The release site provides / will provide similar and / or better microhabitats to the habitats being lost (e.g., leaf litter, natural debris, some undergrowth, and long grass).
- The resident population within the release site is likely to be persisting in low or very low numbers. A low-density resident population will minimise negative effects of overcrowding and allow for population growth.
- The lizard release site is located in a recreation reserve associated with the Tauranga Racecourse, and restoration and management of the reserve is ongoing (administered by Tauranga City Council). As such, the release site is very unlikely to be developed and will be afforded ongoing protection through the District Plan and Reserves Act 1977.



Map 2: Proposed lizard Release Site in the Kōpūrererua Valley.

8.1 Soft release pen

A soft release of any captured native lizards will be implemented to keep lizards within the managed habitat and minimise the risk of lizards homing back to their captured locations. The lizards will be released into an approx. 15 x 15 m silt fenced area with the bottom edge buried slightly (5 – 10 cm) into the soil, located in a suitable location within the skink sanctuary. This will prevent the skinks from climbing over or escaping underneath the fence. The soft release pen will be installed prior to any habitat clearance and left in place until all habitat clearance and lizard salvage has been carried out for the project. If vegetation clearance is to occur over stages, it may be necessary to establish additional soft release enclosures to allow releases to occur in cohorts and so that pens do not remain closed for an extended period of time.

The soft release pen is to be located so that part of the release site will be exposed (no current canopy cover) and part will be shaded. This will provide native lizards with a heterogeneous habitat of shady and sunny areas within the pen. Planting and habitat enhancement is proposed for the area surrounding the release pen (see section 8.2) to increase habitat refugia for relocated lizards. As the planting matures overtime, suitable canopy cover will establish providing shelter for any native lizards present.

A maximum of 40 native skinks will be released into a single soft release pen. If more than 40 native skinks are caught an additional soft release pen at the release site will be installed prior to continuing salvage operations.

8.2 Release site enhancement

The release site will be initially prepared through the removal of exotic trees and weedy species from the lower section of the community (the western edge). In the areas that are opened up by this clearance, woody debris will be installed in large, dense, and complex piles[8].Low growing native vegetation will also be installed around these wood piles to provide additional refugia and food sources (detailed below in Section 8.2.1).

These enhancements will increase the complexity and availability of habitats for native lizards. The debris piles and habitat planting will be located both within the soft release pens and throughout the surrounding habitat.

8.2.1 Release site planting

Following the removal of exotic trees/weedy species and the installation of woody debris at the release site, where there are gaps native plants suitable for providing lizard habitat will be scattered throughout the site.

Copper skink habitat in the Bay of Plenty is best created by the dense planting of native vegetation that creates cool, damp, deep leaf litter, which includes habitat features such as rotten logs preferred by copper skinks. One key aim is that the interstitial spaces of the features added to plantings should be as small as possible, so the habitats provide refugia from pests such as rodents. These habitat enhancements also provide value for the rarer ground dwelling species in the area.

[8] We do not recommend the use of rock stacks in this area as it is likely to only provide refugia for plague skinks.

8.3 Predator control

Pest animal control is required for the release site, targeting pests such as rodents (rats and mice) and mustelids. These pests are a major threat to lizards through predation and are likely present in high numbers both within the site and the surrounding areas.

There is currently a pest control network in place at the site, including traps and bait stations. The exact number and layout of this network is yet to be confirmed, but additional control implemented for this project will be integrated within the existing management programme.

A bait station grid at 25 x 25m spacing[9] will be set out across the pest control area, using a combination of bromadiolone bait (knock-down pulse) and diphacinone bait (subsequent pulses). During the first 'knockdown' pulse all bait stations were filled with bromadiolone bait are being checked and topped up twice weekly for between four and eight weeks (until rodent tracking is less than 10%). At the end of the knock-down period all bait should be removed and disposed of as per the toxin label requirements. Subsequent pulses will be undertaken using diphacinone bait.

Post the initial knockdown phase bait stations will be inspected and re-baited quarterly in the first year. Thereafter, they are to be reviewed annually and maintained as appropriate. While pest control is proposed, emphasis must be put on providing complex microhabitats such as woody debris piles to provide refugia from predators.

To further enhance the mustelid and hedgehog control at the release site, DOC 200 traps will be installed at 50 m spacings within a 200x200m area[10] centred on the release site (approximately 16 traps at 4 traps per hectare). These traps will be checked and serviced at a schedule aligned with the initial knockdown phase of the bait station network and thereafter aligned with the pulse schedule of the bait stations.

The duration of pest animal control post release will be determined by the number of skinks released into the area, as follows;

- <20 lizards = 3 years post the last release of lizards into the area.
- 20-39 lizards = 4 years.
- 40+ lizards = 5 years.

Where the project is staged over multiple years and predator control has ceased between a previous release and the next proposed release the pest control process resets. An initial knockdown control is required once again, and the duration of pest control is determined once again by the number of lizards released.

[9] This is the recommended spacing for mouse control, which will be required here.

[10] This area may contain land parcels that are not able to be accessed for control and therefore this is a suggested area to be applied where practicable.

8.4 Predator monitoring.

8.4.1 Rodent and Mustelids

Tracking tunnels will be utilised for monitoring the change in rodent and mustelid abundance over time within the proposed relocation site. Tracking tunnels will follow the lay out and spacing of the DOC 200 trap network.

If following control rodent detection remains higher than 20% (rats) or 30% (mice), additional intensity of control should be introduced (as detailed in 8.4.2 below). A tracking index of 20-30%, although relatively high, may reflect the small size of the area and large home ranges of mustelid species and therefore a tracking target is not suggested for mustelids.

For all monitoring rounds all tracking tunnels should be activated using crunchy peanut butter during fine weather and left overnight. The following day tracking tunnels should be checked. If the cards are still clear they can be utilised for mustelid monitoring (see below).

Every second tracking tunnel (i.e., 100m spacings) should be activated for mustelid control. To do this peanut butter should be removed (if no tracks are present) and replaced with fresh rabbit meat. Cards should then be left out for a further two fine nights before being retrieved. If tracks are on cards following rodent monitoring these should be replaced with new cards and baited.

8.4.2 Contingencies for rodent and mustelid control

If rats and or mice are detected at numbers higher than the above thresholds (20 and 30%) an additional two weeks of baiting should be carried out i.e., an additional two bait station installs in the current pulse and a second round of monitoring should be carried out. If there is persistent exceedance of the rodent detection thresholds the bait station network shall be infilled to allow for a 10m x 10m bait station layout for the remainder of the pest control period as outlined in section 8.3.

If any mustelids are detected during the monitoring period, the DOC200 traps should be adjusted to a twice-monthly check and rebait. This will ensure that bycatch in these traps i.e., rats are removed quickly to ensure these traps can continue to catch mustelid species. This may then be reviewed annually to determine whether the frequency can be readjusted.

8.4.3 Other species

Tracking tunnel monitoring may detect the presence of additional species such as hedgehogs. Monitoring of these species is not suggested; however, their presence will be noted and additional DOC200 traps may be installed if presence appears high.

9.0 Habitat remediation

To further enhance lizard habitat, planting associated with the project within the Proposed Designation including the areas proposed to be restored as part of the effects management package and landscape plantings will include the addition of lizard micro-habitat elements. This

will be implemented as and when appropriate throughout the plantings focusing on areas connected to existing habitats. Landscape planting across the project will also incorporate suitable plant species to provide habitat for copper skinks (and other terrestrial or arboreal lizards), and plant lists will be developed in consultation with a qualified ecologist/herpetologist.

10.0 Contingency actions

There is inherent uncertainty in the outcomes of lizard salvage and release as a result of the complexities of the process and management of the release site for species conservation. Discovery of threatened species, the release site no longer being viable, a high number of lizard captures, or predator control being ineffective are triggers for contingency actions. These actions can have significant implications and often represent a requirement for works to stop temporarily while DOC is consulted on how to proceed.

- In the event of another threatened lizard species being discovered, vegetation clearance works will be stopped, and DOC will be notified.
- If the number of native lizards captured is very high (which is unlikely), multiple release areas will need to be set up, and predator control expanded to protect these areas as well.
- If the proposed release site becomes no longer viable (e.g. if the structure of the vegetation community drastically changes between now and the commencement of salvage, or if Tauranga City Council withdraw support for the release occurring here) an alternative must be found. In that instance DOC will be contacted and provided an updated lizard management plan detailing the new release site.

11.0 Data collection and reporting

At the release site[11] morphometric data of all captured native lizards will be captured including species, sex, snout vent length, tail length and tail regen. Any unique or unusual markings or injuries will also be noted. In addition, the habitat type from which capture took place, time, weather, and GPS points of the location are to be recorded. Photographs of each specimen are to be taken and appropriately catalogued for later reporting.

All captured lizards are to be recorded using the Amphibian and Reptile Distribution Scheme (ARDS). A copy of the ARDS cards will be submitted to DOC if native lizards are found.

[11] Do not collect morphometric data at the time of capture, only at the release site as a lizard may escape from handling during measurements and judgement calls can be made to forgo morphometric data collection and release immediately if individuals are showing signs of stress.

12.0 Post release monitoring

Monitoring is not recommended for small relocations such as < 30 individuals, as these can be extremely challenging to monitor due to low detection rates. For releases >30 individuals, post release monitoring should be conducted at the release site after two years and five years to analyse the outcome of the relocation efforts. This will help determine the success of the translocation. For small relocations, resources are better allocated to mitigation activities such as enhancing relocation site lizard habitat.

Post-release monitoring methods will be carried out at the discretion of the project herpetologist but may involve tracking tunnels and other passive methods. Monitoring is not to include any destructive or intensive searches. Monitoring effort will reflect the number of lizards salvaged and will be at the discretion of the project herpetologist.

A post-release monitoring report (if post-release monitoring is triggered (>30 lizards salvaged) will be prepared following each monitoring event (i.e., annually). Copies of the reports and records of the lizards will be provided to DOC.

13.0 References

Anderson, P., Bell, T., Chapman, S., & Corbett, K. (2012). *New Zealand lizards conservation toolkit: A resource of conservation management of the lizards of New Zealand*. Society for Research on Amphibians and Reptiles of New Zealand.

Department of Conservation. (2012). *Inventory and Monitoring Toolbox: Herpetofauna*. Department of Conservation.

Department of Conservation. (2019). *Key principles for lizard salvage and transfer in New Zealand*. Prepared by the Department of Conservation Lizard Technical Advisory Group.

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

Kessels & Associates Ltd. (2017). *Tauranga Northern Link ecological assessment*. Prepared by Kessels & Associates Ltd for NZ Transport Agency.

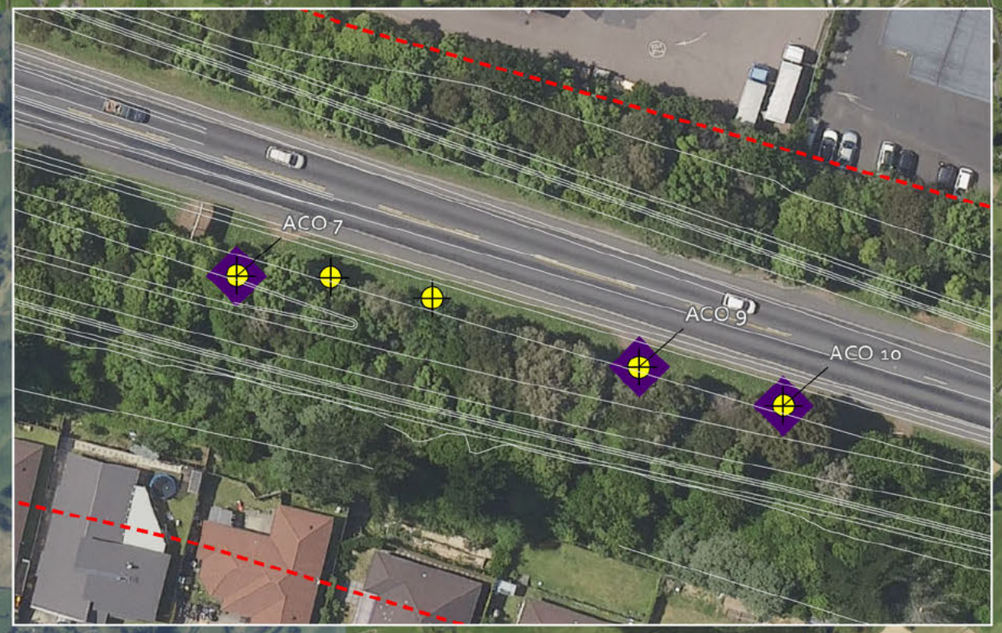
Roper-Lindsay, J., Fuller, S. A., Hooson, S., Sanders, M. D., & Ussher, G. T. (2018). *Ecological impact assessment (EcIA). EIANZ guidelines for use in New Zealand: Terrestrial and freshwater ecosystems* (2nd ed.). Environment Institute of Australia and New Zealand.

Turner, M. K., Kelly, D., & Lettink, M. (2023). Effect of pitfall trap design on internal trap temperature and the implications for live-trapped lizards. *New Zealand Journal of Ecology*, *47*(1).

van Meeuwen-Dijkgraaf, A., Shaw, W. B., & Mazzieri, F. (2009). *Ecosystem services of protected areas and ecological corridors within the Kaimai-Tauranga Catchments* (DOC Technical Report Series 2). Department of Conservation East Coast Bay of Plenty Conservancy.

Van Winkel, D., Baling, M., & Hitchmough, R. A. (2018). *Reptiles and amphibians of New Zealand: A field guide*. Auckland University Press.

Appendix 1: Survey locations



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DRAFT

Data Sources: Eagle Technology, Land Information New Zealand, GEBCO, Community maps contributors

Projection: NZGD 2000 New Zealand Transverse Mercator

LEGEND
- Designation
- Alignment
- ACO Location
- ACO Survey Result

SH29 TAURIKO WEST IMPROVEMENTS

Herpetofauna Survey

Date: 19 June 2026 | Revision: 2

Plan prepared for Waka Kotahi NZ Transport Agency by Boffa Miskell Limited

Project Manager: s9(2)(a) | Drawn: JWa | Checked: KSi

About Boffa Miskell

Boffa Miskell is a leading New Zealand professional services consultancy with offices in Whangarei, Auckland, Hamilton, Tauranga, Wellington, Nelson, Christchurch, Dunedin, and Queenstown. We work with a wide range of local and international private and public sector clients in the areas of planning, urban design, landscape architecture, landscape planning, ecology, biosecurity, cultural advisory, graphics and mapping. Over the past five decades we have built a reputation for professionalism, innovation and excellence. During this time we have been associated with a significant number of projects that have shaped New Zealand's environment.

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